COAL MINING

"The Picture-Book of the Industry"

MARCH 1949 VOLUME XXVI, No. 3

Photo Courtesy Joy Manufacturing Co.

Right Here

Kennametal Bits

Save 6¢ per Ton...

Year Around

John W. Fordyce, progressive, cost-conscious superintendent of the Penn Valley Mining Co., Hunkers, Pa., says "During the year 1948, Kennametal U-1 Mining Machine Bits have saved 6 cents on cutting cost per ton of coal produced. The number of bit changes has been reduced 20 to 40 times. The number of man hours at the face is nearly 20 per cent lower."

Kennametal Bits have been used as standard equipment at the Penn Valley Mine for nearly three years. These are the reasons:

1. *Ability to cut extremely hard-cutting coal . . . at a bit cost of only 1.52 cents per ton. (1948 average)*
2. *A net savings on sharpening cost averaging $200 per month.*
3. *Fewer man hours required per coal face.*
4. *More places cut per shift.*

Kennametal Bits feature hard, durable Kennametal cemented carbide cutting edges—the cemented carbide that has higher strength. The harder, tougher edge that is the exclusive . . . dependable feature with all Kennametal mining tools.

We will gladly supply complete particulars. Write Mining Division, Kennametal Inc., Latrobe, Pa. for booklet M-5 today!

BREAKING ALL PERFORMANCE RECORDS

at less cost

● You can't top a McCarthy for record-breaking performance, especially where the going is really tough. For instance—workers using a McCarthy on one difficult job, drilled 6-inch diameter holes 80 feet vertically in only 20 minutes! This rugged drill has many advanced features for easier, faster drilling. The derrick is raised and lowered by finger-tip power control, and a 32 H. P. motor is an integral part of the truck-mounted machine. A hydraulic lift for rods and booms is also power-controlled.

This time-saving drill is used on a 1½-ton truck, or larger, and is also adaptable to diamond drill boring. When in place for drilling, two individually operated jacks are easily set to take the strain from the truck springs. Write today for complete information, and for a free copy of the Salem Tool booklet.

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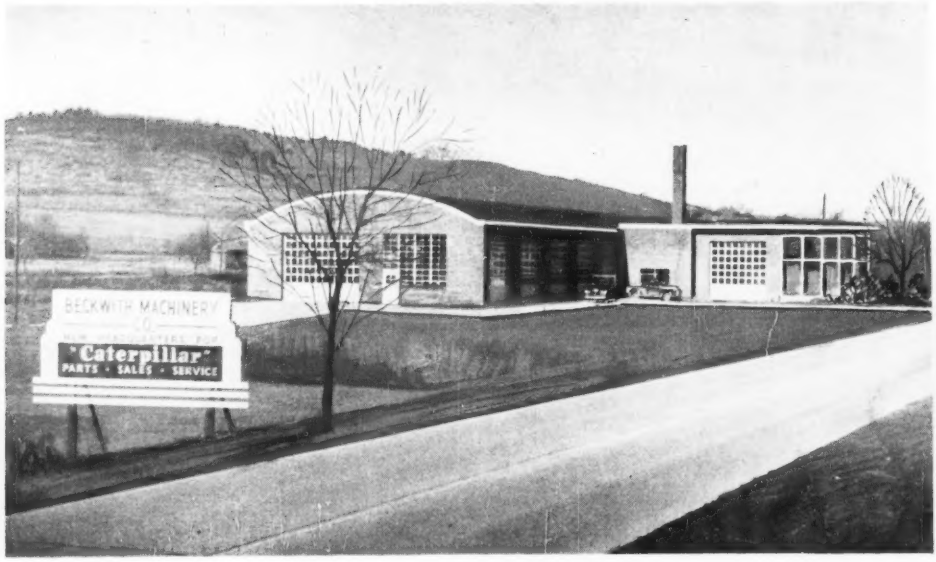
NOW UNDER CONSTRUCTION . . .

Increased facilities for "Caterpillar" Diesel Users at Clearfield, Pa.

BUILT to better serve all "Caterpillar" Diesel users in this thriving area, the Beckwith Machinery Company new headquarters now being built at Clearfield, Pa., will be a wonderful convenience and time-saver.

Here on Old Town Road will be carried a complete stock of genuine "Caterpillar" parts; replacements and repairs will be handled by Caterpillar-trained mechanics.

Not yet quite ready for business, but destined to be a busy and handy spot for "Caterpillar" Diesel users.



Another view of the new modern building, devoted to service, sales and parts for heavy equipment users.

If you have a "Caterpillar" Diesel job in this territory, it is good to know you have the Beckwith service available. Until new headquarters are opened this spring, parts and field service can be obtained at 216 North 3rd Street in Clearfield. Here ready for you are thousands of parts, and mechanics who know construction equipment.

Let Beckwith service keep your jobs rolling and your machines going full force. It pays you to be a Beckwith Machinery customer.

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MACHINERY COMPANY

BECKWITH MACHINERY COMPANY

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On jobs like these Highway Equipment means added profits!

Nard Engineering & Mining Company, near Oakdale, strips with 25 yd. Gar Wood scraper drawn by Allis-Chalmers HD-19 Diesel Tractor with another HD-19 as a pusher.

Paul E. Kerlin Coal & Construction, Inc., near Export. Allis-Chalmers HD-19 pushes overburden, cleans face of the coal, builds drainage ditches and roads.

Galande Mine, near Export. Hough Payloader, Model HL, loads coal.

A-2067

ON STRIPPING JOBS throughout Pennsylvania you'll find efficient equipment sold . . . rented . . . serviced by Highway.

"See Highway first" is the profit slogan of leading coal operators. Here's why:

- ***Highway sells products of leading, reputable manufacturers.***
- ***Highway rents modern, up-to-date, efficient machines . . . no junkers or "fuel hogs."***
- ***Highway backs its equipment with round-the-clock parts and repair service.***

Let Highway representatives share your stripping problems . . . give you the benefit of "know-how" gained in the Highway equipment school, in manufacturers' plants and in extensive "on-the-job" experience.

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for

BIG LOADS

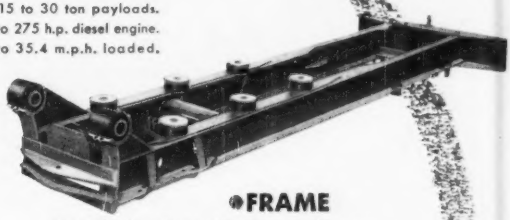
and

TOUGH HAULS

Euclids have earned their reputation for efficient, dependable service on the toughest haulage, mine and quarry service. Their rugged strength and stamina has made "EUCS" the standard hauling equipment of many leading operators. Here are some of the reasons why:

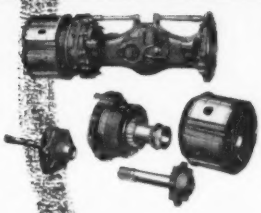
REAR-DUMP EUCLIDS

CAPACITIES—15 to 30 ton payloads.
POWER—150 to 275 h.p. diesel engine.
SPEEDS—Up to 35.4 m.p.h. loaded.



•FRAME

The Euclid frame is a welded structure of tremendous strength. Large rubber body support pads cushion the impacts of loading under large shovels and hauling capacity loads over rough roads. There is no metal to metal contact between body and frame.



•DRIVE AXLE

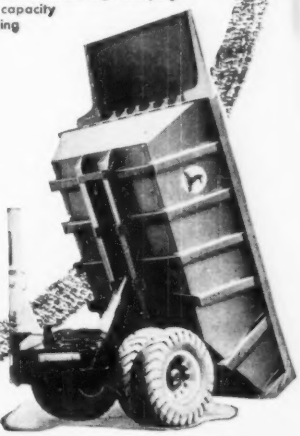
The planetary type drive axle of Euclid design and manufacture has been used on all Euclid hauling equipment for over fifteen years. It is unequalled for long life and continuous performance in off-the-highway service.

•BODY

Rear-Dump Euclid bodies are designed for hauling rock and heavy excavation. Smooth interior and flared rear chute provide unrestricted flow of material. Sturdy box sections reinforce the heavy body at sides and bottom.

•HOIST

The double-acting Euclid hydraulic hoist provides positive control of body at all times. High dumping angle and ample hoist capacity assure fast, clean shedding of the load.



The services of a hauling equipment specialist are available upon request and without obligation . . . write or call your Euclid Distributor.

EUCLID

Stripping and loading

BAY CITY DOES BOTH WITH EASE

Here are two BAY CITY Model 65 Crawler Shovels displaying a bit of versatility to the profit of their owners in the Pennsylvania coal fields. On one hand, it's stripping — with 25-foot boom and 20-foot dipper stick stretching w-a-a-y out to dump overburden from a 22′ cut. On the other hand, it's loading — with the powerful three part hoist. There is no need to "shoot" the 50″ to 56″ coal seam for loading. There is speed and power a'plenty in the BAY CITY 65. Maximum digging radius of 36′8″ with the boom at 45°; maximum dump radius is 30′4″ at maximum dumping height. Wire for complete details and catalog about versatile BAY CITY shovels, or see your nearby dealer.

BAY CITY

SHOVELS CRANES • HOES • DRAGLINES • CLAMSHELLS

BAY CITY SHOVELS INC., BAY CITY, MICHIGAN See your nearest Bay City dealer for excavating and material handling equipment in sizes from ⅜ to 1¼ yard with crane rating up to 20 tons. Both crawler and pneumatic tire mountings.

COAL MINING

VOL. XXVI MARCH, 1949 NO. 3

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Our Creed: To promote mechanization in the Coal Mining Industry; to advance living conditions of mine employees.

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efco* *Friction Material*

Twenty years practical field experience. Specially engineered frictions. Dependable warehouse stocks . . . EFCO's combination for added hours of service on shovels, draglines, cranes, and tractors.

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Combines all the features of an efficient, mobile, 105 ft. compressor with the flexibility of a 35 hp. wheel tractor —

IT
Pulls,
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Designed for Efficient Stripping? *You Bet!*

Can Hendrix "take it"? *Absolutely!*

★ 20% to 40% lighter than other buckets, type for type.

★ All welded construction for greater strength and durability.

★ Manganese steel chains, fittings, and reversible tooth points.

★ Full Payload every trip with perfect balance.

★ 12% cast manganese steel lips with tooth bases cast integrally.

★ Failure-proof ARCH of rugged box-section construction.

★ 3/8 to 40 Cubic Yards. With or without perforations.

Less MAINTENANCE *More* PROFIT

You, too, can get higher profits through lower maintenance by using a Hendrix HEAVY DUTY, TYPE "HS" BUCKET which is armored with cast manganese steel runners and wearing plates. Every type "HS" is equipped with renewable manganese steel shoes for runners and wearing plates. Coal strippers are hailing this feature which enables you to replace those parts which wear the most *right on the job*. They like the failure-proof ARCH of rugged box-section construction, too. If you like higher profits, you'll like the Hendrix "HS".

HENDRIX *Lightweight* **DRAGLINE BUCKETS**

For descriptive literature ask your dealer or write

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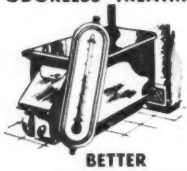
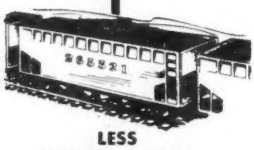
PERMANENT ODORLESS TREATMENT


BETTER STOKER FEED

CLEAN HANDLING


LESS WINDAGE LOSS

DUST-PROOFING WITH

PERMATREAT COAL SPRAY

MEANS *Cleaner* **YEAR 'ROUND DELIVERIES**

Permatreat is the answer to more deliveries of coal in summer, for housewives know dust-proofed coal won't cause additional housecleaning. More summer sales mean more time for fall and winter deliveries and thus greater profits through additional deliveries. You'll find domestic consumers "sold" on coal as a fuel when it's dust-proofed.

Ashland Permatreat Coal Spray can be furnished in low, medium and high viscosity ranges to treat all grades of coal. Talk it over with an Ashland representative. He'll gladly give you the facts and help with any preparation problem. Write today!

ASHLAND OIL & REFINING COMPANY
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DO YOU KNOW . . . ?

A portable instrument based on the principle of the seismographs which register earthquakes is being used to measure vibration problems on machinery and other equipment.

Called the "industrial seismograph," the new instrument was developed by the Barry Corporation and the Westinghouse Electric Corporation. It is about the size of a box camera and can measure vibrations with a frequency as low as 120 cycles per minute. First job for the instrument was measuring the vibration of walls in a textile mill.

* * *

Black light is playing an important part in the inspection of axles and other parts for flaws and defects.

Black light is the term popularly applied to the invisible radiant energy in that portion of the ultraviolet spectrum beyond visible light. In the testing of parts materia's are used which fluoresce or emit visible light from within themselves during exposure to black light. Two fluorescent liquid inspection methods are used, one for magnetic and one for non-magnetic metals. They are termed magnaflow and zyglo respectively.

* * *

Reflective radiant conditioning, not the relatively new radiant heating system, will be employed to keep a house to be constructed here comfortable in summer and winter, the University of Cincinnati revealed today.

The house when completed will contain none of the conventional furnaces, air-conditioning units and insulation. Walls and ceiling surfaces are to be of embossed aluminum foil, one of the best heat-ray reflectors known. In place of heating plant there will be a few electrical resistance coils in each room for generating heat rays.

Cooling coils, resistance wires for heat, and fluorescent color lighting will all be placed in a cove near the ceiling, giving heat and light and removing radiant heat in hot weather only by indirection. The scheme, according to the university, is to heat and cool through radiant channels almost exclusively, with little or no concern for air temperatures or humidity.

* * *

A new high-temperature, transparent plastic, that can be tempered somewhat as metals are hardened, is now in limited commercial production.

Made up of fluorine and chlorine to the extent of four-fifths of its weight, it is related to the new family of organic compounds, the fluorocarbons, which reached practical development during the war. Chemically it is trifluorochloroethylene.

Produced by M. W. Kellogg Co. here, it came out of the laboratory of Dr. W. T. Miller of Cornell University.

Extremely resistant to chemical action, even to concentrated sulfuric, hydrofluoric and hydrachloric acids, it is nevertheless easily worked into shape. Although strong and hard, it is not brittle. Although suited to use at as high as 390 degrees Fahrenheit, it is also very satisfactory at very low temperatures, even at the cold of liquid nitrogen, 320 degrees Fahrenheit below zero. It is a good insulator for electricity and heat, and water rolls off it like the proverbial duck's back.

Because it withstands weather so well, it is likely to be used in instruments, airplane and ship parts, railroad signals and electrical insulation that get hard outdoor usage. It can substitute for glass in laboratories and chemical plants and handle corrosive gases and liquids.

It will be used at low temperatures and for e'ectrical insulation in corrosive or humid conditions. Because it is not wetted by water or humid atmosphere, one use will be to avoid electric short circuits due to water film condensation.

* * *

Three pounds of Trisodium phosphate to a gallon of hot water, plus a cupfull of amonia will remove old whitewash from wall and allow painting.

* * *

Streptomycin, one of the late earth-mold drugs, has produced remarkable results in curing tuberculosis at the Bettery State Hospital in Rome, Georgia. After a year's experimentation with Streptomycin on 650 patients, Dr. Rufus F. Payne, Superintendent of the hospital said "there is no doubt that Streptomycin has saved and prolonged hundreds of lives."

* * *

Tomorrow's auto engine is going to give 25% more miles per gallon and you will be filling up at the gasoline pump on such high-compression fuels as triptane, toluene, benzene and trimethylpentane as well as superleaded "gas."

The American Chemical Society was told by leading petroleum chemists that new fuels for more efficient engines can be ready by the time the automotive engineers can build, test and produce them commercially.

Since 1930 the efficiency of fuel utilization in passenger cars has increased by more than 30%, John M. Campbell and Dr. Lloyd L. Withrow of the General Motors Research Laboratories, Detroit, told the chemists. In addition to this improvement, high-compression ratio engines combined with high-octane gasoline of early-war aviation grade could push the efficiency 45% further.

Today's auto engine wastes 75% to 80% of the gasoline's energy and a gain of only 1% would save one to two millions of gallons of gasoline daily in the United States.

Present commercial gasoline sold at filling stations range between 70 to 90 octane and engines of newer passenger cars have compression ratios of about 7-to-1.

Sizable saving would occur with 8 to-1 engines and gasoline in the 96 to 98 octane range, a grade that the petroleum industry could produce to the extent of about 20% of its total gasoline volume.

Push the compression ratio up to 12 and 15-to-1, and new fuels chemically tailored by the newer methods of refining will be needed.

Movements of as little as a hundredthousandth of an inch can be detected with the "transducer", a new instrument developed by scientists at the National Bureau of Standards.

This device, which consists of a coiled spring whose turns separate one by one when the ends of the spring are pulled apart, is being studied by W. A. Wildhack and his associates.

When the spring is closed, it has the same resistance as a solid tube of metal. But when it is completely open, it has the resistance of the total length of the coiled wire. Since the change in resistance when the spring is stretched may be hundreds of times greater than the change in length of the spring, the transducer is a very sensitive way of measuring small displacements. An electrical instrument which measures resistance precisely is simply hooked up to the transducer and the change in resistance read.

The transducer may be very useful both in industry and science in such things as strain gages, pressure elements, accelerometers, electric weighing devices, automatic temperature controls direct current-alternating current inverters and voltage regulators.

* * *

The metal titianium, which few have seen although it is plentiful in the crust of the earth, gives promise of replacing many metals now in use, including steel in construction. Now commercially available, it is stronger and lighter than steel, it resists high temperature, is rustless and does not corrode easily.

Called one of the world's most modern metals, it was first obtained from its ore and seen as a metal in 1825. During the war, the U.S. Bureau of Mines worked out a process and produced some metallic titanium. Only in the last few months could it be purchased on a really truly commercial scale, the scientists stated, and still the production is relatively small because there is not yet any large demand for it.

* * *

A silica substance which acts as a nearly perfect diffuser of light gives promise of making the present inside-frosted electric incandescent bulb obsolete. It is said to give results superior to the diffusion from regular inside-frosted lamps without diminishing lighting efficiency.

The new deve'opment, revealed today, is a product of the General Electric lamp laboratory here, and is credited to Marvin Pipkin a quarter of a century ago. The new inside finish is being introduced in three new lamp bulbs, a 100-watt lamp, a 100-200-200-watt three-lite lamp, and a 150-watt lamp.

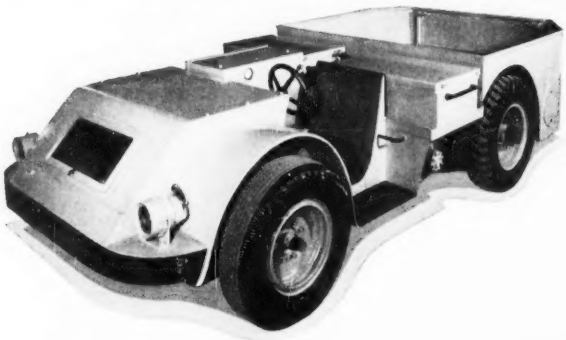
Inside-frosting of bulbs has been the best method of providing diffused light up until now. Other schemes have been tried but none was found satisfactory. Included were sand-blasting the outside of the bulb, the use of milk-white glass, outside coatings and inside fused coatings.

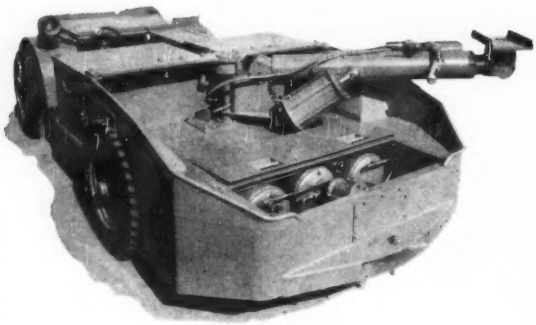
When metals break, the fractures begin with extremely small cracks, investigations by General Electric scientists show. The break does not occur instantaneously throughout the sample, as usually assumed. The tiny cracks are the nuclei which grow into a large split when enough tension is applied.

NOW—THE RJI "MINE JEEP"

is fully equipped for 5 Complete Operations!

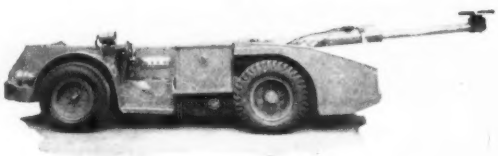
Here is the all round service unit for your trackless mining systems





TIMBER BOOM

Telescoping timber mounted on rear platform.
Operated by two air lifting cylinders
Self leveling timber head
Swing 55° to each side of center
Hand swing with automatic air brake stop
Hand operated telescoping and 36" extension



1 UTILITY TRUCK
For handling supply and materials needed for operating and maintenance crew.

2 MINE TRACTOR
For pulling rubber tired trailers, with timber and other supply, also to pull miscellaneous equipment such as rock dusters, air compressor units, etc.

3 GREASE & SERVICE UNIT
Fully equipped with air operated oil and grease guns for complete lubrication of mining machinery at the working face.

4 TIMBERING MACHINE
Equipped with air operated timbering boom and power driven timber saw

5 POST PULLER
Four speed transmission gives power and speed for pulling post.
Can also be equipped with electric driven winch.

GENERAL DIMENSIONS

Overall height	36"
Overall width	76"
Overall length	14'-7"
Wheel base	80"
Timber boom-Max. height	8'-6"
Timber boom-Max. Swing	55° each side of center

Please write for bulletin and complete information.

Lee-Norse Company
CHARLEROI, PA.

Four Foot Shafts Core-Drilled For Ventilation And Escapement

This article was written to attempt to show the utilization of large diameter Core-Drilled Shafts when drilled from the Surface into a Mine, for ventilation and escapeway purposes. The Lorain Coal & Dock Company of Blaine, Belmont County, Ohio, is mining the Number 8 Seam or Pittsburgh Vein of Coal. This company operates two mines from this seam of of coal, namely Blaine and Stanley. Blaine Mine has been operated since 1910 with a daily tonnage of from 3000 to 4000 tons, therefore you can realize the extensiveness of the area mined over since that time. The mine was opened from the Eastern side of the property and the Western Property line is about 3½ miles from the portal.

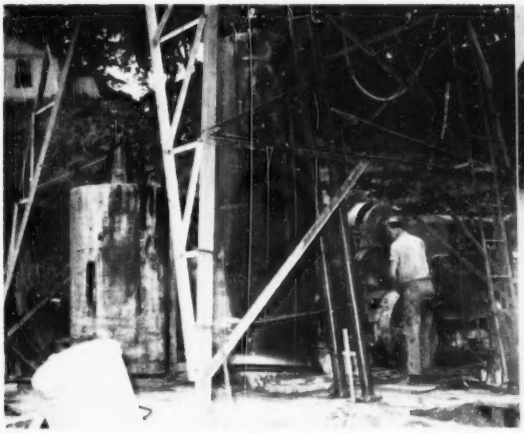
About 18 months ago the realization of additional coal property became apparent and the management then realized that an additional escapement way should have to be provided closer to the working faces, therefore, locations and prices were investigated as to this possible new opening to the surface. The possibility of drilling a 48 inch shaft by the core-drilling process was called to our attention and since its cost would be from 1/8 to 1/10 of that of the Slope or Shaft and since due to complicated figures as to savings made possible by lessening the travel time for the men getting to their working faces, versus the difference in costs of the two methods of making an opening from the surface to the mine, we decided to seriously consider the 48 inch shaft, and finally a contract was entered into with the Pennsylvania Drilling Company of Pittsburgh, Pennsylvania, to drill the shaft.

When we acquired the additional coal acreage we immediately started developing entries toward the proposed shaft and about April 15, of this year, the drilling company moved their equipment to the site of the shaft.

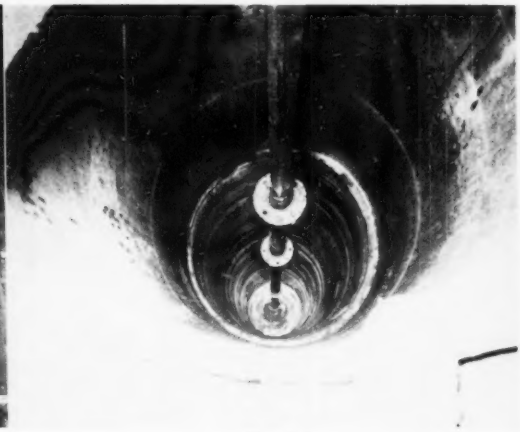
Since this method of Drilling is done by core-drilling using shot as a

Sketch 1

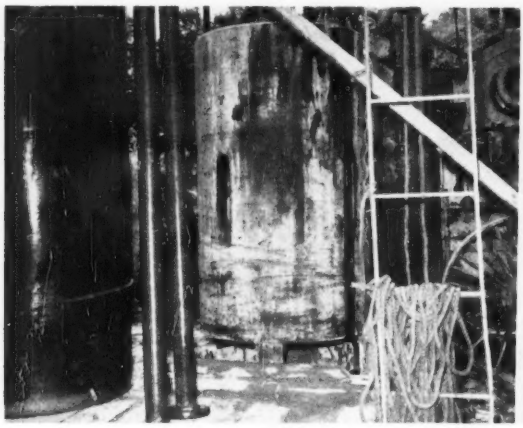
Sketch 2



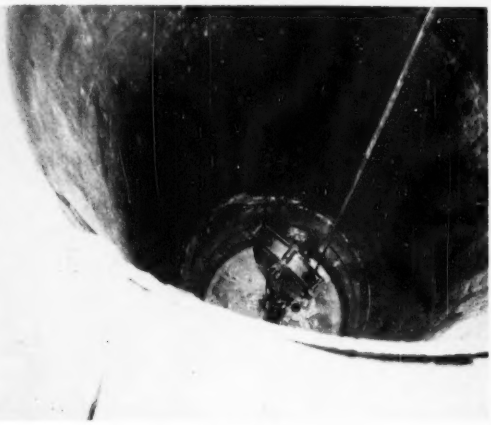
Sketch 3



Sketch 4



Sketch 5



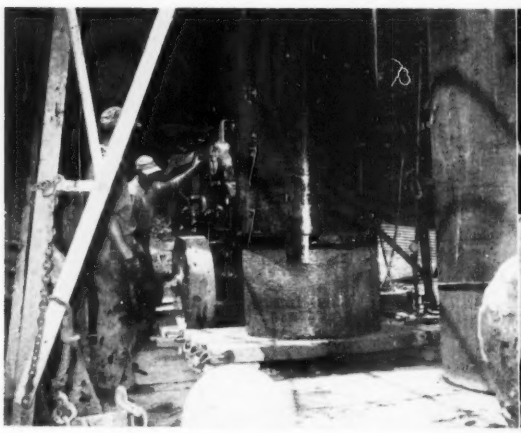
Sketch 6

cutting medium, it is important that the drill rig be set up perfectly level and centered over the proposed shaft, but since the drilling starts from bedrock, the unconsolidated materials from the surface to bedrock must be removed by manpower, then a steel shell is centered in this space and the annular space outside of this steel shell is filled with concrete from hard rock up to the surface or to where a perfectly level concrete base is made for the drilling machine to operate from.

Actual drilling was started about the 10th day of May, but of course as in most drilling operations, caveins occurred and water springs were encountered. These were easily sealed off by special methods developed by the Pennsylvania Drilling Company. The drilling of this 48 inch core-drilled shaft being the largest as well as the first to be drilled into a coal mine, along with lack of knowledge of the structure of stone and materials overlying the coal, caused the work to proceed rather slowly at time as some of the cores, either would not break as desired or would break up into segments laterally or diagonally, making it necessary to lower a man into the hole to either trim the core so that the core lifter could grasp it or if the core was not of such material that it could be lifted, it would be blasted and loaded out by manpower. The men employed to drill these shafts are experienced in this line of work and therefore overcame any and all obstacles encountered and on October 9th, the shaft was forced through into the mine, a total distance of 202 feet.

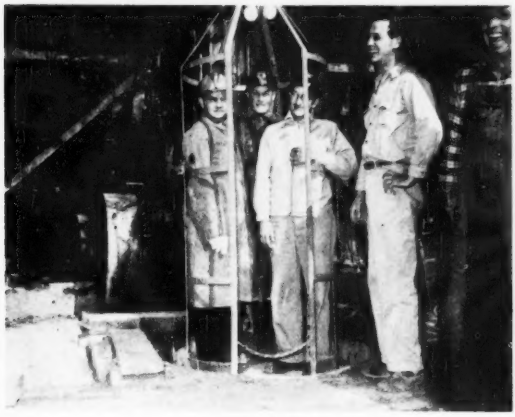
The drilled shaft was not lined, as the smooth cut rock wall made this unnecessary. The only wall treatment required was the grouting off of water and the sealing off of several weak fire-clay beds. These later were taken care of by reaming the shaft to a large diameter at that point and pouring a ring of cement that was left flush with the shaft wall.

As was formerly stated the entries leading to this proposed shaft was started sometime before the drilling began and of course were finished ahead of the drilling operation. Not knowing definitely at the beginning whether the new opening would be a shaft, slope or the 48 inch hole, 4 entries were driven abreast so in case of a portal provisions would have been made for man trip cars, supply tracks, proper ventilation as well as a neutral air course entry for a manway escapement. The total distance from the main haulage entries to the

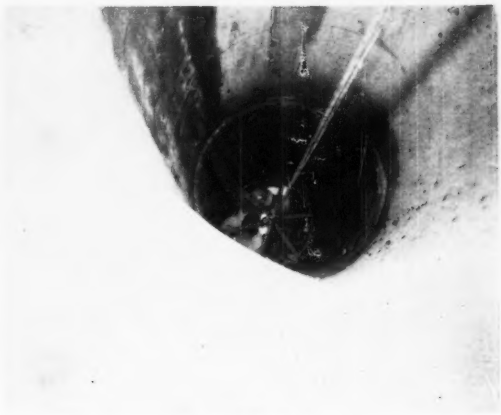


Sketch 7

Sketch 8



Sketch 9



Sketch 10

proposed new opening was about 600 feet and about 450 feet of entry had been driven when the contract for drilling the 48 inch shaft was signed and of course this type of opening eliminated possible portal facilities, so two of the entries were stopped and only two were driven the remaining 150 feet and they at about 45 degrees to the left off the 4 entries to where the shaft would enter the mine. This was planned in advance as it permitted a better method of taking care of men coming into the escapement entry in case of emergency. Normally this 48 inch shaft will be used as a partial exhaust of the mine ventilating air current. Since the primary purpose of drilling this 48 inch shaft was for an emergency escapeway for the miners, this exhaust air must be directed away from the manway entry. This is done by making an airlock just outby of where the two entries were turned at an angle to the left. The inner door of this airlock being close to the aforementioned angle. Inside of the airlock and near the inner door is a device which permits men to close either one or both of 2 doors in the normally return air course without exposing themselves to obnoxious gases, smoke or foul air, thus changing the course of the return air to the outside, thereby making the shaft an independent airway. A sketch is here shown to make it clear how this is done.

In addition to the aforementioned escapement entries, an additional entry was started and will continue to be driven on the right side of the main haulageway entries, to be used as a neutral manway escapement entry, and at intervals of approximately 300 feet, entrance to this escapement entry will be provided. This entry is connected by incombustible overcasts across the main west entries to the formerly mentioned airlock in the entry directly connected with the bottom of the 48 inch shaft. We think that in most cases of emergency, this neutral entry would permit most all workers to travel safely to the bottom of the 48 inch shaft or the formerly stated airlock, where the men could wait until standby facilities at the top of the shaft could be placed in operation. These facilities include a circular steel casing, bullet shaped cage connected to a permanently fixed derrick and hoist rigging, which is powered by a gasoline motor. Entrance to the cage is made by opening door to a steel portal welded to a steel cylinder which is connected to the shaft and extending about 15 feet above the normal level of the surrounding ter-

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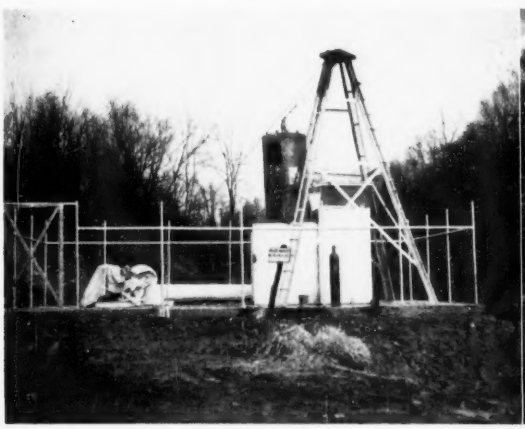
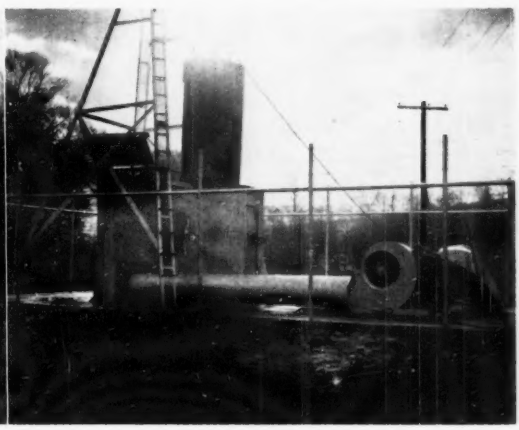


Sketch 11



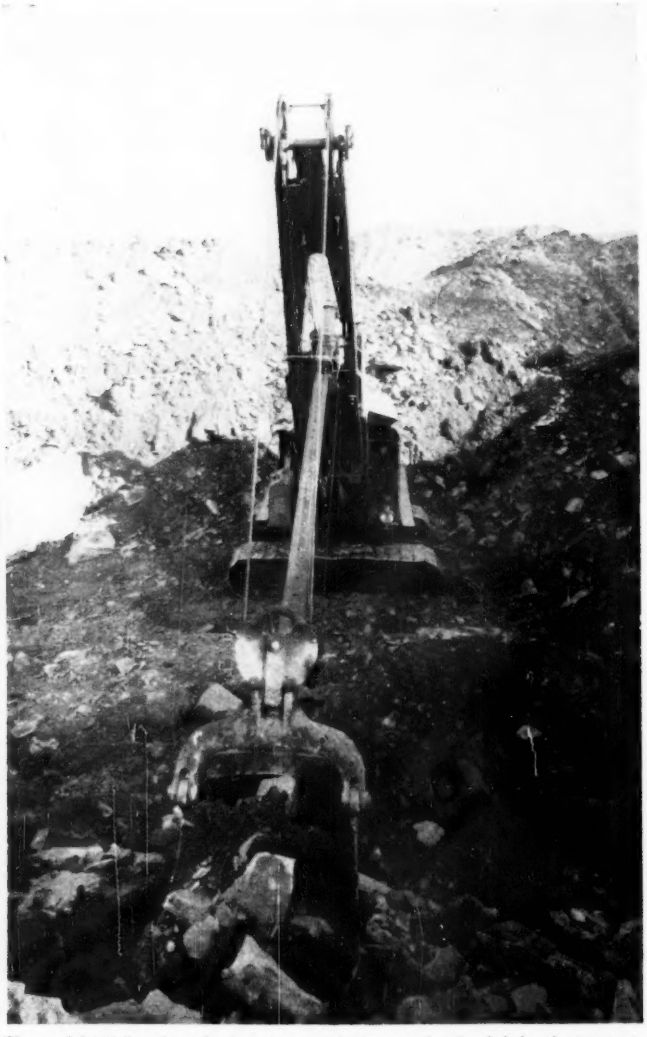
Sketch 12

Davey "Airchief" Compressor on highwall before the tractors and stripping shovel.

Caterpillar D-8 tractor pushing top layers off highwall.

Stripping Crop Coal Left In Deep Mining, Irwin Gas Coal Basin

Cleanliness Of Equipment Outstanding Feature Of This Operation



The model 820 Lorain stripping shovel stripping overburden left by the tractors.

This earth can be considered a material system into and out of which there is a continuous flux of energy, resulting in a continuous or intermittent circulation of the material constituents of the earth surface. Most of the energy from this process was derived from solar radiation. An infinitesmal part of matter near or at the surface of the earth occurs in what is known as living organisms. Geologists tell us that living organisms have been on this earth a billion years. Evolution of some of the organisms proceeded far enough that a species of them recognizable as man must have existed a million years ago, in some sort of ecological adjustment with the rest of the organic complex, competing for a share of the solar energy essential to existence. That hypothetical man's capacity for the utilization of energy consisted in the food he was able to eat. For hundreds of thousands of years there was no emancipation from this dependence upon contemporary solar energy.

About the thirteenth century A. D. inhabitants on the shore of the East Coast of Britain discovered a black rock that would burn and called it "sea cole." From this discovery, resulted the mining of coal, the smelting of metals, the development of the steam engine and steam electric power.

In the year 1864, the Annual World Production of Coal reached

180 million metric tons. Since 1914, production of coal increased geometrically at a rate of 4 percent and annual production was doubled every 17 years. By the end of 1947, production of coal in all human history amounted to about 81 billion metric tons. Forty billion or about one half of that tonnage was produced since 1920.

Our coal deposits represent an accumulation of more than 500 million years of geologic time. When coal is burned it undergoes a sequence of degredations and remains on the earth in a relatively useless form. We are drawing upon our storehouse of energy at a phenominal rate. The most accurately known quantity of fuel on this earth is coal. In recent years, mining engineers have been telling us that only one-tenth of the estimated tonnage of coal in this earth is recoverable by present practical mining methods. We already know that some grades of high qaulity coal in the Eastern half of the United States are getting scarce.

Coal deposited in the Irwin Gas Coal Basin, lying in Westmoreland County, Pennsylvania, between the towns of Irwin and New Alexandria and famous for its gas producing and coking qualities, is rapidly nearing exhaustion. Lying mostly under heavy cover this coal has all been deep mined in the past. There is some area, however, where it outcrops and the remaining bits at the otucrop that have been left in deep mining are being recovered by stripping.

Such an outcrop area is being stripped by Paul Kerlin of Irwin, just South of the town of Export which is on U. S. Route 22. The crop coal lies under cover ranging from 0 to 40 feet in height and consists of top soil, yellow shale, lime rock and hard blue shale.

The model 82 Lorain shovel loading out the coal.

Holes for blasting the overburden are made with a 105 cubic foot Davey Airchief compressor. The top layer of the overburden is pushed off with tractors. A model 820 Lorain shovel with 2 cubic yard dipper then moved the rest of the overburden down to the coal.

The coal seam runs 7 feet in thickness and is loaded out with a model 82 Lorain shovel with a 2 cubic yard dipper. Roof conditions in deep mining this coal, at least in the cropping area, must have been bad for valuable timbers felt in the entries when deep mining are being recovered and run up to 8 by 8 in size.

In all my travels through most of the coal stripping areas of this country I have never seen machinery kept in so excellent condition, nor have I ever seen the men in charge of equipment so enthusiastically try to keep equipment clean. What Mr. Paul Kerlin does to make his men enjoy working with clean equipment could not be learned, but one thing could plainly be seen and that was a great pride in clean equipment, yet a fear that the boss might not be entirely pleased.

The equipment is washed down from top to bottom once every week, using fuel oil. All mud or dirt is removed from tractor treads of shovels and tractors and washed with fuel oil.

Kennametal Inc., Latrobe, Pa announces the appointment of James V. Wilcox and Jason C. McGuire as sales and service representatives. Mr. Wilcox is located in Provo, Utah, serving the territory of Utah, Wyoming and western Colorado. Mr. McGuire is located in Eastbank, West Virginia, serving the central West Virginia territory.

H D 19 Allis-Chalmers tractor making haulage road in the pit to stripped coal.

Caterpillar D-8 tractor back filling in area that has been stripped.

Concord Mine of TCI to Produce 7,500 Tons per Day of Coking Coal

By J. C. GRAY, *Assistant Manager of Raw Materials*
Tennessee Coal, Iron and Railroad Company, Birmingham, Alabama

Condensation of a paper presented at the December 10, 1948 Regional Meeting of the American Institute of Civil Engineers in Birmingham, Alabama.

Concord Mine of the Tennessee Coal, Iron and Railroad Company is located near Hueytown, Alabama, approximately 15 miles west of Metropolitan Birmingham. When completed, it will be the largest capacity coal mine ever operated by TCI and will be one of the truly large coal mines in the South. It will have a nominal capacity of 1,000 tons per hour of run of mine, and a nominal capacity of 7,500 tons per day of coking coal. Sufficient surface rights are held to provide more than ample space for all necessary surface construction, including mine buildings. Mineral rights held at this property are sufficient to permit continuous mining at maximum production for at least 20 years.

Concord Mine is operated in what is locally termed the American Seam, although some geological authorities consider this seam a split from the well-known and widely worked Pratt seam. The coal, when properly prepared, is of metallurgical fuel classification and when mixed with other coals from the district makes good blast furnace coke.

The coal seam varies considerably in thickness throughout the property. In those areas where the rock parting is not too thick the entire seam will be taken and the rock separated at the surface. However, in some areas, the rock partings are so thick as to discourage extraction of the entire seam. In the present stage of development a typical section is as follows: twenty-six and one half inches of top coal, 7 inches of rock, 20 inches of coal, 21½ inches of rock and 16½ inches of bottom coal. Full seam mining of this section produces a yield of 52.5 per cent coal.

The mining program calls for completely mechanized operations. The method follows the room and pillar system with complete extraction within a panel. Room entries will be driven on 370-foot centers and average 1800 feet in length. At the face the coal will be cut by mechanical rubber mounted cuttings machines, blasted from the undercut face by permissible explosives, and loaded by mechanical mobile loaders into rubber tired shuttle cars that discharge into an elevating conveyor for loading the 8-ton, 8-wheel cars on mine track.

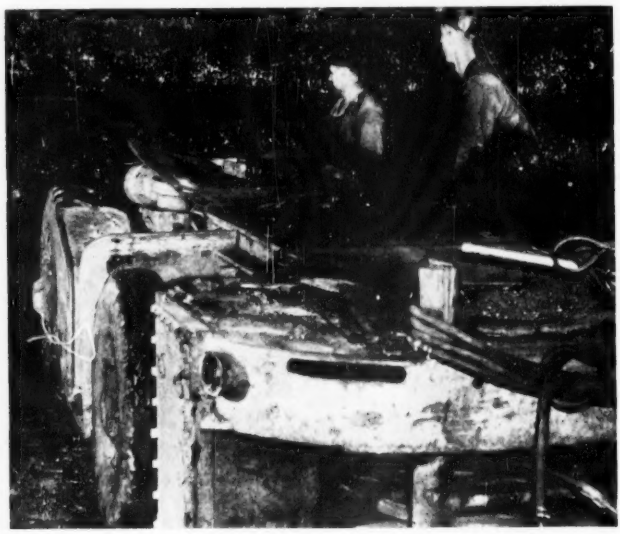


Figure 1. Coal face being undercut in the Concord No. 1 Mine recently opened by Tennessee Coal, Iron and Railroad Company, a United States Steel Corporation subsidiary. The mine is located near Hueytown, Alabama, approximately 15 miles west of Metropolitan Birmingham. All cutting is performed by mechanical rubber-mounted cutting machines of the type shown.

The 8-ton cars are transported to the underground dump yards by electric locomotives. Here the cars are fed automatically to a two-car rotary dump by an elaborate system of car hauls.

The dumped coal and rock drops into a small hopper beneath the dump from which it is withdrawn by two 60-inch, heavy-duty, apron feeders. These feeders discharge to two heavy-duty magnetic-belt separators which remove tramp iron from the circuit.

The discharge from the magnetic belts passes over two 5-foot by 10-foot single-deck scalping screens, making an 8-inch separation. The undersize from the screen drops into a hopper while the oversize goes to two 36-inch diameter by 54-inch face, single-roll reduction crushers set to produce a product not exceeding 8-inch thick slabs. Some of these slabs may be as much as 24 inches in length. The crushed materials joins the screen undersize in the hopper and is withdrawn by two 36-inch wide apron feeders and delivered to a 42-inch short-center buffer belt traveling at 575 feet per minute.

This short-center belt speeds up the flow of coal and delivers it to the main-slope belt at the same speed that the main-slope belt travels, thereby minimizing wear on the main belt. Also, this short buffer belt takes the punishment of any pieces of tramp iron or other potentially damaging material not removed by the magnetic separators. This short-center buffer belt delivers to the tail pulley of the main-slope conveyor belt.

The main-slope conveyor belt is

Figure 2. Blasted face ready for loading in the Concord No. 1 Mine of Tennessee Coal, Iron and Railroad Company near Hueytown, Alabama. When completed, this mine will be the largest capacity coal mine ever operated by this United States Steel Corporation subsidiary. Only permissible explosives are used in blasting.

reputed to be the highest single lift in the world. Its length from tail pulley to head pulley is approximately 2,500 feet, and the total lift is approximately 730 feet. The belt itself is 42 inches wide and is built with a 3/16-inch rubber cover on the carrying side. Carrying a load of 1,000 tons per hour to a height of 730 feet imposes severe strain on both belt and driving mechanism. How severe these strains are can be seen when it is noted that the maximum pull at the head pulley when the belt is fully loaded and started is approximately 160,000 pounds. This means that the belt structure must support a stretch of 80 tons. An ordinary fabric belt would not be able to withstand such stresses, and it was necessary to provide a special steel-cable core for this conveyor belt.

To insure sufficient friction between driving pulley and the belt, it was necessary to employ double driving pulleys with approximately 270° of belt wrap around each pulley. On the lower of the two pulleys there are two 300-horsepower wound-rotor motors connected to the pulley shaft by herringbone speed reducers. These two motors are sufficient to provide belt capacity adequate for initial operation. When necessary, a third motor and reducer will be added. All motors are interlocked and interconnected through the electrical control system.

After the coal leaves the head pulley from its position 73 feet above the ground, it drops over a splitter mechanism and divides into two equal streams, each stream going through a parallel circuit. In times of emergency, when breakdowns occur, or when on-shift maintenance is required, the entire stream can be handled by one of the parallel circuit.

Each circuit consists of a heavy-duty, double-deck, vibrating screen; the top deck of which scalps off the big rock slabs and drops them into a rock crusher while the intermediate deck oversize (minus 8 inch and plus 2 or 3 inch) drops into a rotary Bradford breaker. Here the tumbling action causes the coal lumps to be pounded through the openings in the breaker shell while the rock lumps remain more or less intact and pass over the perforated shell and are discharged at the end of the breaker. These rock lumps also drop to the crusher, where they are crushed to approximately 2½-inch size. From the crusher, rock is taken by conveyor to a rock bin and discharged into 22-ton bottom-dump, semi-trailer diesel truck which carry it to the dumping area.

The fine coal dropping through the vibrating-screen lower deck and the fine coal pounded through the Bradford breaker shell drops onto a temporary loading conveyor going to the railroad cars, which presently transport it to the companys Wylam

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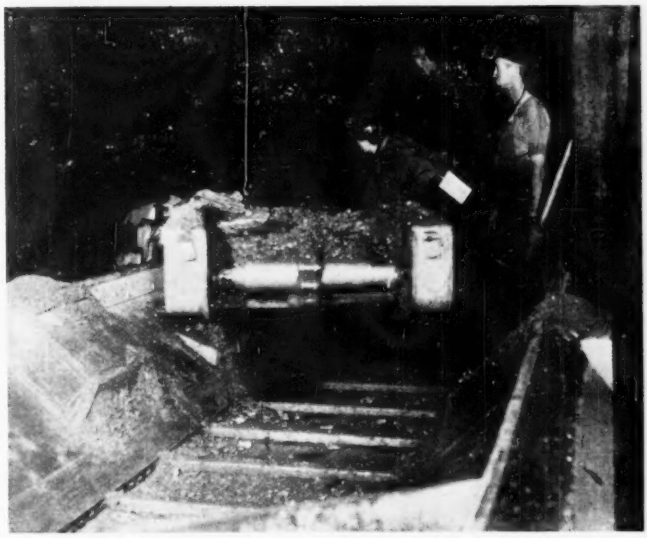
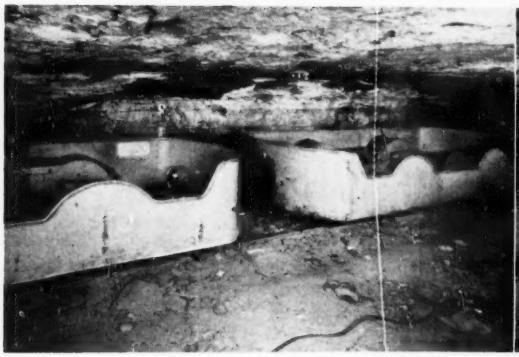
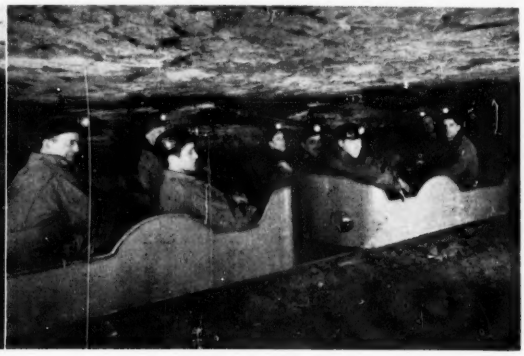


Figure 3. Mechanical mobile motor loading coal into rubber-tired shuttle car in the Concord No. 1 Mine of Tennessee Coal, Iron and Railroad Company, a United States Steel Corporation subsidiary. The shuttle cars discharge into an elevating conveyor for loading the 8-ton, 8-wheel cars on mine track.



Empty mantrip Jeep.



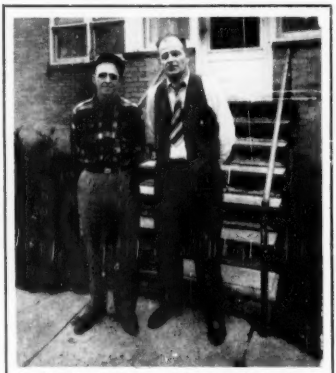
Loaded mantrip Jeeps

Mantrip Jeep Featured At Midvale Ohio Mine

Several months ago Mr. A. B. Macke, General Superintendent of the Columbia Coal Division of the Pittsburgh Plate Glass Company (formerly Midvale Coal Company) at Midvale, near New Philadelphia, Ohio, conceived the idea of the use of mine Jeep bodies as mantrip cars for transporting his crews to their working places.

Mining the Lower Freeport seam of coal running 4 feet thick, operations at the Midvale Mine extended three miles from the mine mouth and mantrip time in mine cars pulled by locomotives were consuming more time than was thought necessary.

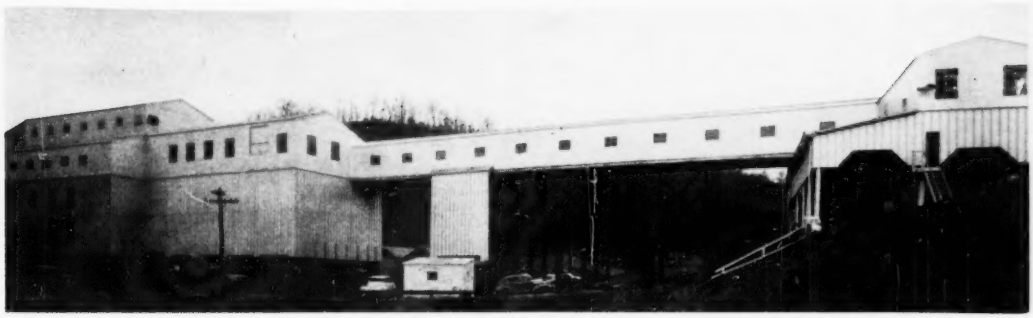
Having a Lee-Norse Jeep for travel through his mine Mr. Macke had the Lee-Norse Company build one Jeep body with a hand brake-no driving motor. Besides the regular cross seats built into a Jeep Mr. Macke ordered a three inch wide seat built all around the car body so that as many men as possible could be transported in case of an emergency. The mantrip Jeep car is pulled by a regular Jeep and as many as 10 men have been hauled in the car. The first of these cars paid for itself in travel time in three months. This mine now has five mantrip Jeep cars and more are contemplated. At present two cars are pulled by a Jeep and each car hauls five men. At the working places the Jeep and the cars are side tracked while the men are working and the Jeep is used for hauling timbers and supplies to the face. The unit is also always ready to quickly haul



A. B. Macke, General Superintendent, on left, and Paul Bentel, General Manager.

W. Proven, Assistant Mine Foreman, left, and D. Fox, Chief Electrical examining an electric motor.

Mine Office Building.



The Jeffrey Two Compartment Unit Washery and railroad loading tipple on right.

one or all the men out of the mine in an emergency.

Run-o-mine coal is fed to a Jeffrey Two Compartment Diaphram Unit Washery capable of handling from 125 to 175 tons of raw coal per hour, ranging from 6-inch lump down to zero, in which case $\frac{1}{4}$ to 0 can be centrifugally dried. Tipple has a new Jeffrey double roll crusher for crushing 6-inch coal or rock before it enters the washer. Washing unit screens coal into 3 sizes—6 x 2, 2 x $1\frac{1}{4}$, $1\frac{1}{4}$ x $\frac{1}{4}$.

After being dewatered and sized, the washed coal is delivered to various compartments in bins by a three compartment mixing conveyor.

In addition to a 2,000 ton sized coal storage bin, two belt conveyors deliver slack or sized coal to railroad cars. No hand pickers are used in this plant and all coal is mechanically cleaned.

Mine Examination Questions and Answers

(Continued from January Issue)

Q. 19. (a) What are the recuirements of the law relative to flame-resistant trailing cables?

(b) What are specifications for flame-resistant trailing cables?

A. 19. (a) (20 pts.) The requirements for trailing cables used in coal mines are outlined in the following Acts:

Act No. 206, approved May 15, 1945.

Act No. 89, approved May 9, 1947.

These Acts shall apply to all coal mines operating in the Commonwealth of Pennsylvania, in which five or more persons are employed at any one time. It shall be unlawful to operate any portable electrical machine by means of a trailing cable unless such cable is safely and efficiently insulated by flame resisting material and approved by the Secretary of Mines. These Acts shall become effective one year following their final passage, and their provisions shall be enforced by the Department of Mines; provided, however, on written request from an operator, the time may be extended by the Secretary of Mines for a period of not more than six months; provided, further that any operator, who may at the time of passage of these Acts, have in use a trailing cable, which does not meet the specifications required by these Acts, may continue to use such cables until replacements are necessary, or until the the Department of Mines shall order a cable replaced, but in no event later than the first day of April, 1949. In either such case the new cable shall meet the specifications fixed by the Acts. The action of the Department of Mines in permitting the continued use of trailing cables not conforming to these Acts as originally enacted, because flame resisting trailing cables were not available in sufficient numbers to replace existing cables, as hereby ratified, confirmed and validated.

(b) (30 pts.) A trailing cable that has met the minimum requirements and is approved by the Secretary of Mines, shall receive an approval number. For indentification purposes the sheath or packet of the approved cable shall bear an approval number which shall be prefixed by the letter "P," and the conductor size shall also be shown. This mark shall be placed along the sheath covering at intervals not exceeding 12 feet.

A cable will be approved by the Secretary of the Department of Mines of Pennsylvania, when a sample of it has been tested in accordance with and meets the foregoing requirements, and when the propagation does not exceed fourteen (14) inches.

FIRE BOSS EXAMINATION

Section 1 June 4, 1948

Q. 1. (a) What are the legal qualifications for applicants for a fire boss certificate?

(b) What are the legal duties of a fire boss?

A. 1. (a) (30 pts.) Applicants for certificates of qualification as fire bosses shall be citizens of the United States, of good moral character and known temperate habits, at least twenty three years of age, and shall have had an aggregate of not less than five years practical experience, after eighteen years of age, as miners or mining engineers or men of general work inside the Bituminous Mines of Pennsylvania: Provided, that graduates in the coal mining course of a recognized institution of learning may, after examination, be granted certificates of qualification by the examining board as a fire boss if possessed with an aggregate of not less than three years practical experience as miners, or men of general work inside the Bituminous Mines of Pennsylvania. Applicants for certificates of qualification as fire bosses shall also have had experience in Bituminous Mines in Pennsylvania that generate explosive gas.

(b) (30 pts.) It shall be the duty of the fire boss to examine carefully before each shift enters the mine.

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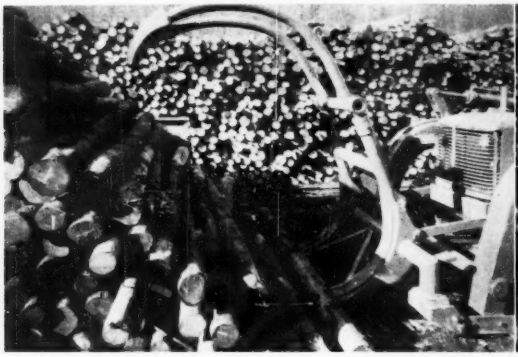
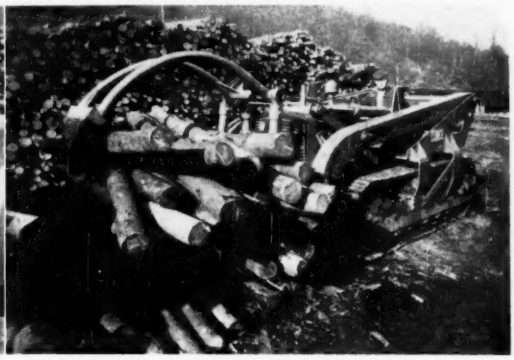


Gathering mine timber the hooks are pushed into the pile of timbers with human assistance.



A load of timber ready to be taken to mine car.

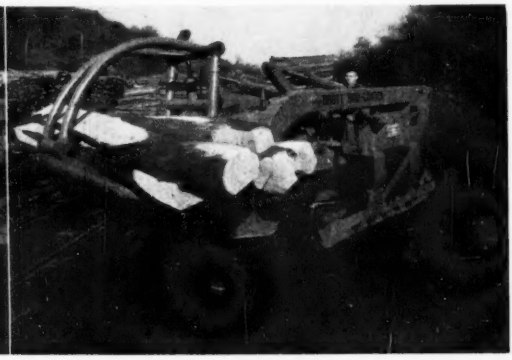
Skid-Loader Is Useful Around Mine

Mine timber have been deposited into a mine car with very little assistance by human hands.

In line with the mechanization of as many operations in and around the outside of a coal mine as is possible, we present this series of pictures of the utility tractor attachment and some of the many uses to which it can be put on the surface.

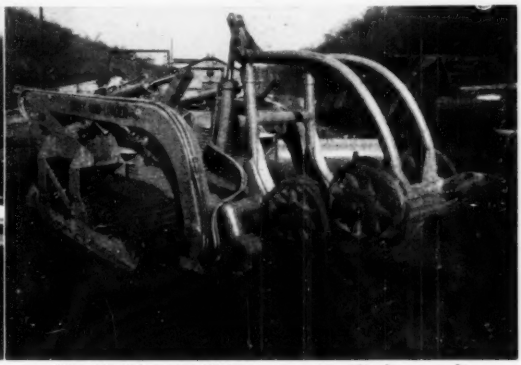
This utility attachment known as the Drott Skid-Loader can be attached to one of several popular makes of tractors now on the market. The Drott Skid-Loader is hydraulically operated and any experienced tractor operator can learn to use it.

Getting the hooks under a pile of cross timbers.



Cross timbers in the hooks and on their way to the mine car which will haul them into the mine.

Stacking loaded drums of oil or grease.



The Skid-Loader lifting mine car wheels on axles.

QUESTIONS AND ANSWERS

(*Continued from Page 23*)

every working place without exception, all places adjacent to live workings, every roadway, and every unfenced road to abandoned workings and falls in the mine, but before proceeding with examination, he shall see that the air current is traveling its proper course. In making the examination, he shall use no light other than that enclosed in an approved safety lamp. The examination shall begin within three hours prior to the appointed time for each shift to enter the mine. The fire boss shall examine for dangers in all portions of the mine under his charge, and after such examination, he shall leave at the face and side of every place examined the date of examination as evidence that he has performed his duty. He shall also examine the entrance or entrances to all worked out or abandoned portions adjacent to the roadways and working places under his charge, where explosive gas is likely to accumulate, and he shall place a danger signal across each entrance to every working place, and every other place, where explosive gas is discovered or immediate danger is found to exist from any other cause, the said signal shall be of sufficient warning for persons not to enter. The meaning of all danger signals shall be explained to the non-English speaking employes of the mine in their several languages by the mine foreman, assistant mine foremen, or fire boss through an interpreter.

A suitable record book shall be kept at the mine office, on the surface, of every mine where fire bosses are employed, and immediately after the examination of such mine or any portion thereof by a fire boss, whose duty it is to make such examination, he shall enter in said book, with ink, a record of such examination and sign same, this record shall show the time taken in making the examination, and also clearly state the nature and location of any danger that may have been discovered in any room or entry or other place in the mine, and if any danger or dangers have been discovered, the fire bosses shall immediately report the location to the mine foreman.

No person shall enter the mine until the fire bosses return to the mine office on the surface, or to a station located in the intake entry of the mine (where a record book as provided for in this section shall be kept and signed by the person making the examination), and report to the mine foreman or the assistant mine foreman, by telephone or otherwise, that the mine is in a safe condition for the men to enter. When a station is located in any mine it shall be the duty of the fire bosses to sign also the report entered in the record book in the mine office on the surface. The record of the fire bosses shall at all times during working hours be accessible to the Inspector and the employes of the mine.

A second examination by the same or other fire bosses shall be made during working hours of every working place where men are employed, and a report of said examination shall be made in the fire boss report book in the same manner as provided for in section two of Article 5.

The mine foreman and the fire boss shall, at or near the main entrance to the mine, provide a permanent station with a proper danger signal, designated by suitable letters and colors placed thereon. In every mine generating explosive gas in quantities sufficient to be detected with an approved safety lamp, when the working portions are one mile or more from the entrance to the mine or from the bottom of the shaft or slope, a permanent station of suitable dimensions may be erected by the mine foreman (provided the location is approved by the Inspector) for the use of the fire bosses, and in said station a fire proof vault of ample strength shall be erected of brick, stone, or concrete, in which the temporary record book of the fire bosses, as described in section two of Article 5, shall be kept. It shall not be lawful for any person, except the mine foreman, and in case of necessity such other persons as may be designated by him, to pass beyond said permanent station and danger signal until the mine has been examined by a fire boss, as provided for in section one of Article 5, and the mine or certain portions thereof reported by him to be safe. The fire boss shall not allow any other person or persons to enter or remain in any portion of the mine through which a dangerous accumulation of gas is being passed in the ventilating current from any other part of the mine. He shall report at once any violation of this article to the mine foreman. (To be continued)

CONCORD MINE OF TCI

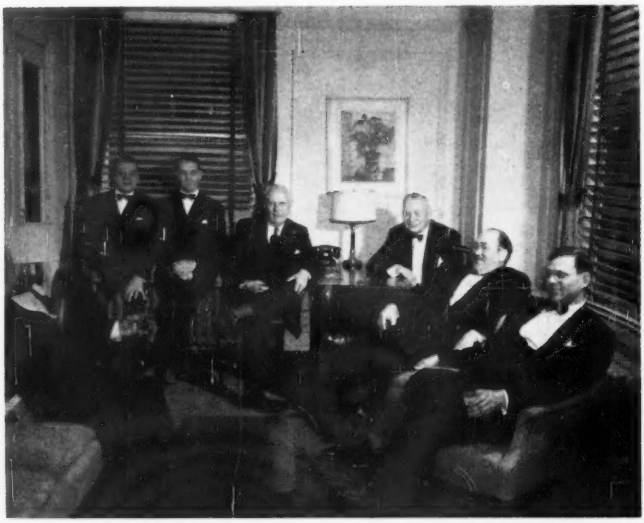
(*Continued from Page 21*)

Plant for washing. Use of the Wylam Plant for this purpose is a temporary arrangement pending completion of the Concord preparation plant.

Several basic design features in the plan of the projected Concerd preparation plant are worthy of mention. On all surface operations, sufficient duplicate units will be provided so that all ordinary maintenance can be done on operating shifts. In addition, complete service facilities will be provided by means of cranes and elevators for all heavy equipment.

Left to right: Earle S. Thompson, President West Penn Electric Company, Francis McQuellin, Assistant to the President, West Penn Power Co., Phillip H. Powers, President, West Penn Power Co., Charles Kingsley, General Manager, Mississippi Plate Glass Co. of Elizabeth, Pa.

Left to right: G. A. Shoemaker, Vice-President, Pittsburgh Coal Co., Don Crocker, Assistant Manager, Industrial Collieries, A. N. Cartwright, Vice-President, West Penn Power Co.

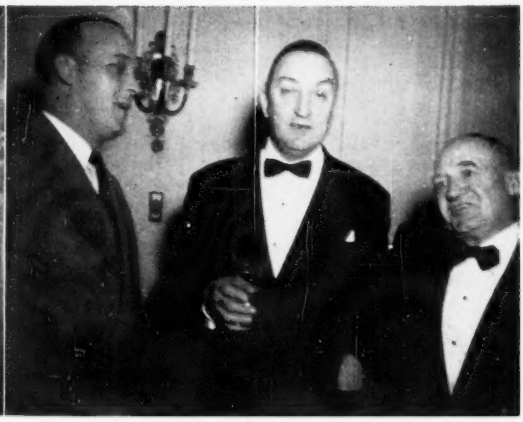


Annual Banquet of the Engineering Society of Western Pennsylvania

The Annual Banquet of the Engineering Society of Western Pennsylvania was held at the William Penn Hotel, Pittsburgh, Pennsylvania on Monday evening, February

Left to right: Ray Middleton, Sales Manager, Roberts & Schaefer Co., A. J. Ruffini, Vice-President, Powhatan Mining Co., R. G. Miller, Engineer, Roberts & Schaefer Co., Frank Mueller, President, Roberts & Schaefer Co., John Harper, Vice-President Eastern Gas & Fuel Association, Whitney Warner, Jr., Vice-President, H. M. Warner & Co., Inc.

Left to right: R. E. Vokach, West Penn Power Co., J. B. Morrow, President, Pittsburgh Coal Co., A. P. Langstaff, Electrical Engineer, West Penn Power Co.

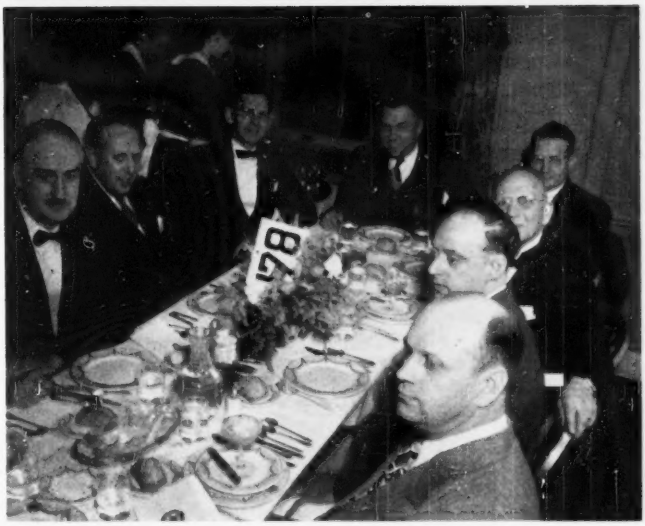


Left to right: H. S. Page, Electric Railway Improvement Co., K. L. Konnerth, Vice-President, H. C. Frick Coke Co., A. C. Schweitzer, Gen. Transportation Engineer U. S. Steel Corp.

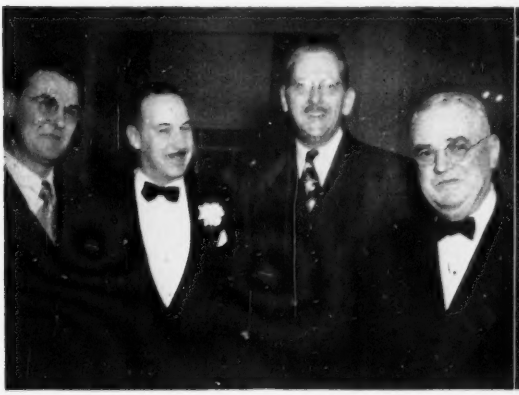
Left to right: J. P. McCune, retired, B. H. Madera, Treasurer, Carpentertown Coal & Coke Co., Kenneth Swanson, Assistant Treasurer Carpentertown Coal & Coke Co. And on extreme right is L. H. Chalfont, Superintendent Elworth Division Bethlehem Colieries Co.

14. As usual this affair was an overwhelming success, filling the main ball-room and two of the other rooms on the Seventeenth Floor of the hotel. Although the dinner service at the Banquet did not start until seven thirty, cocktail parties by manufacturers of industrial and mining machinery and supplies started at five o'clock. The outstanding of these cocktail parties, as usual, was that by the West Penn Power Company where attendance is by written invitation and most guests wear Tuxedos.

Cocktail parties after the Banquet were given by the Mosebach Electric & Supply Company, the Boston Woven Hose & Rubber Company, the Hewitt Rubber Company of Pittsburgh, The General Electric Company and many others.

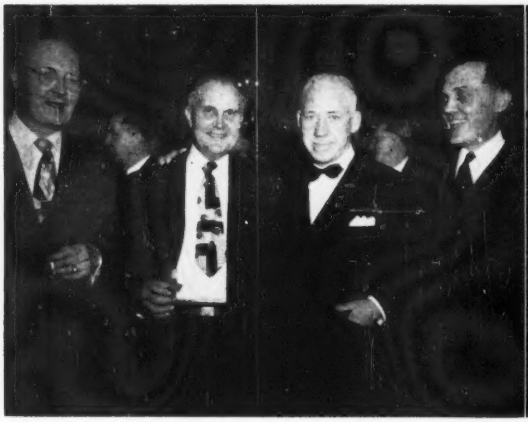


Left to right: Jerome White, Vice-President, Cambria Division Bethlehem Collieries, H. A. McDowell, Assistant Division Purchasing Agent, Eastern Gas & Fuel Association, J. H. Reitz, Assistant Engineer, Republic Steel Corp., S. E. Kane, Mosebach Electric & Supply Co., George Wyant, Superintendent, Indianola Mine Republic Steel Corp., Leo J. Schulte and John Loy of the Mosebach Electric & Supply Co.

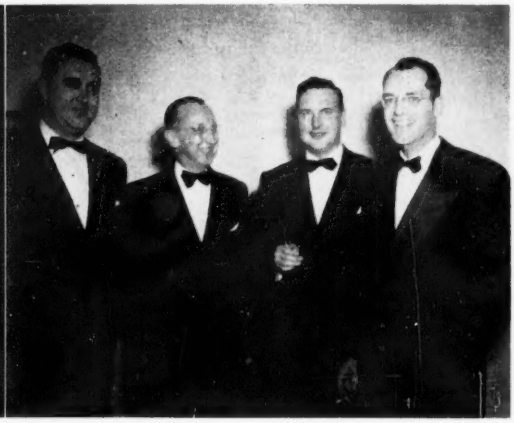


Left to right: C. W. Connor, Jr., Division Superintendent H. C. Frick Coke Co., M. G. Miller, West Penn Power Co., T. E. Foster, Frank Prox Co., F. S. Follansbee, Chief Engineer, Pittsburgh Coal Co.

Left to right: R. G. Johnson, Stewart Johnson, Woody Johnson, all of the R. G. Johnson Co., L. O. Louge, Engineer for Baton Coal Co., C. H. Dorcey, R. G. Johnson Co., Leo N. Skemp, Field Engineer, H. C. Frick Coke Co., C. C. Cornelius, Engineer, Baton Coal Co.



Left to right: W. D. Hockensmith Jr., Hockensmith Wheel & Car Shop Corp., Geo. Saari, Construction Engineer, H. C. Frick Coke Co., E. C. Anderson, Electrical Engineer, H. C. Frick Coke Co., C. F. Browning, Assistant Construction Engineer, H. C. Frick Coke Co.



J. P. Gooding, Ben. C. Gooding, Sr., Ben. C. Gooding, Jr., all of the Boston Woven Hose & Rubber Co., and Charles B. Baton, Vice-President of the Greensburg-Connellsville Coal & Coke Co.

M. S. Lambert, General Manager, Hewitt Rubber Co. of Pittsburgh, Pa., W. B. Jamison, Jamison Coal Co., F. H. Bacharach, President, Bacharach-Strauss Co.

Left to right: M. H. Wainwright, Cleveland, Dal. Norris, Elevator Division, Westinghouse Electric Corp., J. E. Payne, Westinghouse Corp., R. C. Hienton, C.E.I. Co., Cleveland.

As broadcast January 4, 1949, over Station WOL, Washington, on the news program "Washington Today," sponsored as a public service by the Bituminous Coal Institute, representing progressive mine operators—North, South, East and West

The Bureau of Labor Statistics has just completed a survey showing that bituminous coal mining is the largest of the mineral industries. It accounts for more than twenty per cent of all mineral products in point of dollar value. And it employs almost 50% of the total manpower.

The bituminous coal industry currently employs three hundred ninety thousand men. This is five per cent more than in nineteen thirty-nine. But the striking thing is, that with only five per cent more men, the coal industry last year produced more than fifty per cent more coal.

The explanation for this dramatic increase in production lies in competent, progressive management and skillful miners. Mine operators enabled the miner to increase his productivity by over fifty per cent in that period, by spending immense sums—many hundreds of millions of dollars—for new and better machinery to make mining more efficient, safer and easier.

The feat of raising production more than fifty per cent in the space of nine years with only five per cent more workers is a contribution that only free, competitive enterprise could made. No other coal industry in the world can begin to approach this achievement. And it ranks as one of the best results of Americas mass production technique.

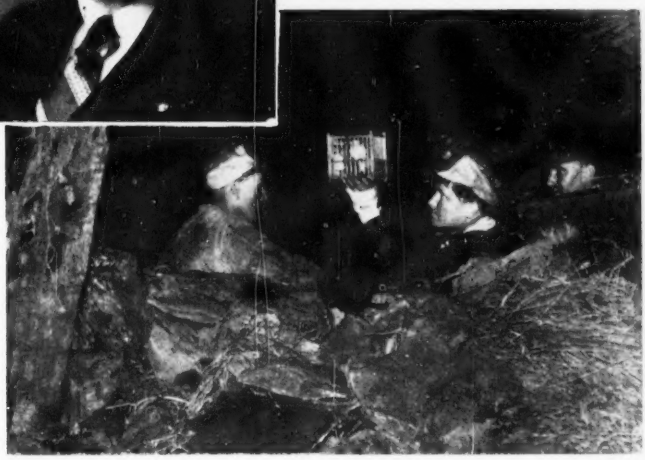
Impressive as the record of the coal industry is to date, it is still on the way up. A progressive management is constantly plowing back its earnings into new kinds of mass production efficiency, and applying its ingenuity to make coal more economical and thus more valuable as a source of new fuels and new by-products.

Architect's sketch of the new research laboratory to be built in Pittsburgh by Mine Safety Appliance Company. It will be the largest laboratory in the world devoted exclusively to the development of safety equipment for mines, industry and public service organizations.

Mine Safety Builds Research Laboratory

John T. Ryan, in whose memory Mine Safety Appliances Company is building the worlds largest research laboratory exclusively for the development of safety equipment, achieved international recognition for his work in safety for mines and all industry.

Mr. Ryan started as a "trapper boy" in the coal mines at Dudley, Pa., when he was 12 years old. Two years later, he was advanced to the position of mule driver.



Before the development of dependable instruments for detection of carbon monoxide and mine rescue work, canaries were used to warn crews of the deadly gas. John T. Ryan, co-founder of Mine Safety Appliances Co. and in whose honor a memorial laboratory is being built in Pittsburgh, is shown here with a canary at the scene of a mine explosion in 1911.

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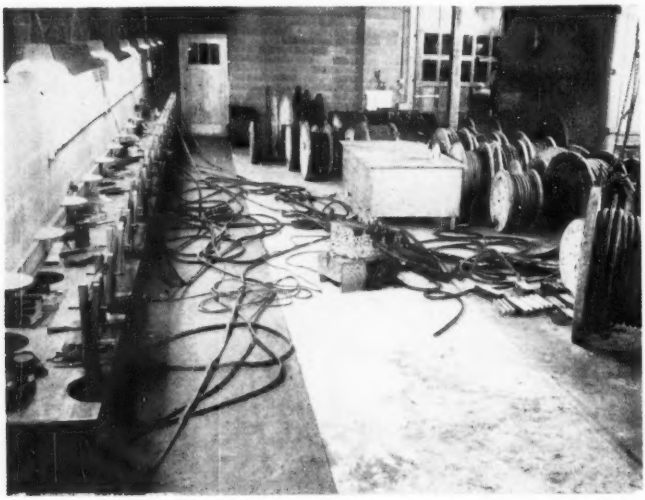

New cable vulcanizing plant of Cyril Davidson at Washington, Penna. It was while working in a mine of the Pittsburgh Coal Company that Mr. Davidson conceived the idea of providing a low cost cable repair service to the coal mining industry. The service consists of splicing and vulcanizing all sizes of rubber coated cable. Insulation on conductors is cured before outer jacket is applied and cured. All work is guaranteed or no charge is made.

The money he earned working underground was used to finance completion of his high school studies and eventually he went to Pennsylvania State College where, in 1908, he received a Mining Engineering Degree. Later, he was awarded the advanced degree of Engineer of Mines at the same college.

After working as superintendent for the Rocky Ridge Coal Mining Co., and in the same capacity for Langdon Coal Co., Hopewell, Pa., Pa., he become Assistant Mining Engineer for the U. S. Bureau of Mines in Pittsburgh.

In this position, he and an associate mining engineer, George H. Deike now president of Mine Safety Appliance Co., recognized the need for better protective and rescue equipment for mine work.

In 1915, he and Mr. Deike formed a partnership and started Mine Safety Appliances Company to develop and manufacture such equipment. The work of the company soon branched into all fields of industrial activity and today the firm is the worlds largest manufacturer of safety equipment.

Mr. Ryan's work with Thomas A. Edison in the design and development of the Edison Electric Cap, of which more than 650,000 are now in use in coal and metal mines throughout the world, was considered one of his more important achievements.

The new Pittsburgh research laboratory to be dedicated to Mr. Ryan's memory this fall will, according to company officials, carry on the humanitarian work he started 35 years ago. Mr. Ryan died in 1941.

Mr. Ryans son, John T. Ryan, Jr., is now executive vice president of the company.

Twelve cubic yard capacity, Morgantown type PENN Body with 613 PENN telescopic hoist, rated at 15 tons. One of many units being operated by Boyer & Vineverski, coal strippers near Oakdale, Pa.

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There's no accident about the presence of that specialty. Every plant is successful because it was intended to be, designed to be, built to be.

Pictured here are two coal cleaning plants in Western Kentucky—different in design and construction because each represented an individual problem; alike in their R and S pattern of success.

Consider your own plant—is it modern? economical? equal to the growing demand for coal better prepared for particular uses? secure against the increasing pressure of competition?

You'll find it worth while to discuss these fundamental questions with R and S engineers.

They can help you determine your potential profit, and show how R and S experience can help you to get it.

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West Kentucky Coal Co., East Diamond Mine, Madisonville, Ky.

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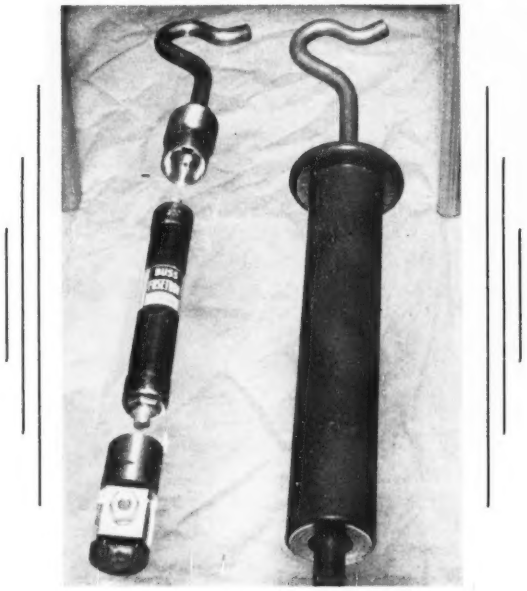
For washing coarse coal R & S HYDRO-SEPARATOR Bulletin No. 171

For washing fine coal R & S HYDROTATOR Bulletin No. 166



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FOUR FOOT SHAFTS

(*Continued from Page 17*)

rain and from this steel portal to the cage which has a circular sliding door, so as to completely enclose the men when it is being lowered or raised.

Directly connected to the hoist motor shaft is an emergency fan capable of producing about 10,000 cubic feet of air per minute blowing through an 10 inch steel tube connected to and through the side of the steel casing sitting directly over the 48 inch shaft. The elevator-like cage will raise or lower 6 to 8 men on a single deck at each trip and the emergency fan operates continuously whenever the hoist motor is in operation, and could be used either to supply fresh air to the men at the bottom or to rescue crews.

As heretofore stated, this shaft was drilled primarily for a safety measure as an emergency escapement, but we have found that 50,400 cubic feet of air per minute is exhaustd from this 49 inch shaft by a natural split of th total ventilating current of a possible 84,000 cubic feet per minute the main fan produces. This condition has caused the water gauge reading of the entire mine air to be reduced to 1¼ inches.

To show further how this 48 inch shaft has affected the ventilation of our mine since it has been completed, we have found that the main intake of ventilation showed the fan to be producing 82,400 cubic feet of air at approximately 400 feet from the fan, whereas before drilling this 48 inch shaft the fan produced only 71,188 cubic feet of air. An air reading was made at 12 south which is approximately 2 miles from the fan and it was found we had 70,000 cubic feet of air as against 52,125 cubic feet before the shaft was drilled. Then an air reading was next taken at 17 south, a distance of about 3 miles from the fan and the first major split of the air, and it was found that the volume of air had increased from 13,2000 cubic feet to 15,950 cubic feet to 19,800 cubic feet after the shaft was drilled.

We are therefore quite satisfied that more of these core-drilled shafts will be used in the future because they offer means of emergency escapeways for the miners, and since their cost is so small compared to the larger shaft, they could be driven in advance of planned mining, thereby keeping the escapeway for the miners at a reasonable radius of distance from the mines working place's at all times.

Pictures were taken from the time this shaft was started until it had

holed into the mine, and in addition to these, some were taken to show the surface facilities and conditions. We will show a few of them to try to give you a better idea of what the conditions were and how the work progressed.

Picture Exhibit No. 1 shows the natural terrain of the surface before the drilling was started. A steel shell 4 foot in diameter by 20 feet long which is to be used as a part of the shaft from bedrock to the surface is shown.

Picture Exhibit No. 2 shows the steel shell in place and one of the drillers is leveling the concrete which has been poured over the hard rock so that the drill will have equal bearing over the entire circumference of the proposed shaft. A concave ring has also been made in this concrete for the shot cutting medium.

Picture Exhibit No. 3 shows the drill cylinder ready to be lowered into the shaft.

Picture Exhibit No. 4 shows the drill tools in action when at a depth of 105 feet.

Picture Exhibit No. 5 shows the core lifter being lowered into the shaft. It will pick up the solid core of rock which has been cut loose by the core barrel.

Picture Exhibit No. 6 shows the core lifter starting to emerge from the water with a segment of core.

Picture Exhibit No. 7 shows the core lifter when raised to the surface and a segment of core being dropped out on the platform, ready to be hauled away.

Picture Exhibit No. 8 shows three segments of cores that were brought up during the day this picture was taken and this process is repeated over and over as cores are cut by the drilling machine.

Picture Exhibit No. 9 shows Mr. E. G. Schell, General Manager of the Lorain Coal & Dock Company, Mr. Frank Sturges of the Pennsylvania Drilling Company and myself, being lowered into the shaft the day after it was drilled into the mine, to inspect for water springs and fireclay beds. Four of such places were found and were sealed off to such an extent that the shaft wall was made dry. The cage shown is only 36 inches in diameter and was made especially for this purpose.

Picture Exhibit No. 10 shows the aforementioned group about 65 feet down the shaft.

Picture Exhibit No. 11 shows the cage sitting on top of the steel portal to the shaft, also a general view of the portal and derrick.

Picture Exhibit No. 12 shows the auxiliary fan, with an 18 inch steel tubing attached to the shaft portal, also note the steel doors at the top of the shaft portal which makes it possible to direct the air out to the atmosphere when the shaft is being used as an exhaust for the mine air during normal operations. Since the fan operates whenever the cage is being lowered or raised, these doors would be closed if the shaft was being used as an emergency escapeway, thereby directing an emergency flow of air down the shaft and into the escapeway entry if necessary.

If you have any question at this time I will try to oblige, or if further information concerning the actual drilling of these core-drilled shafts is requested, I see that Mr. Frank Sturges, Vice President of the Pennsylvania Drilling Company of Pittsburgh, Pa. is here today and I know that he will be glad to offer any helpful information that he can.

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It's a power shovel clutch with direct air power that assures positive control, without any "grabbing" effect . . . a clutch that needs no mechanical attention . . . a clutch whose simple operation automatically compensates for any wear on the clutch linings.

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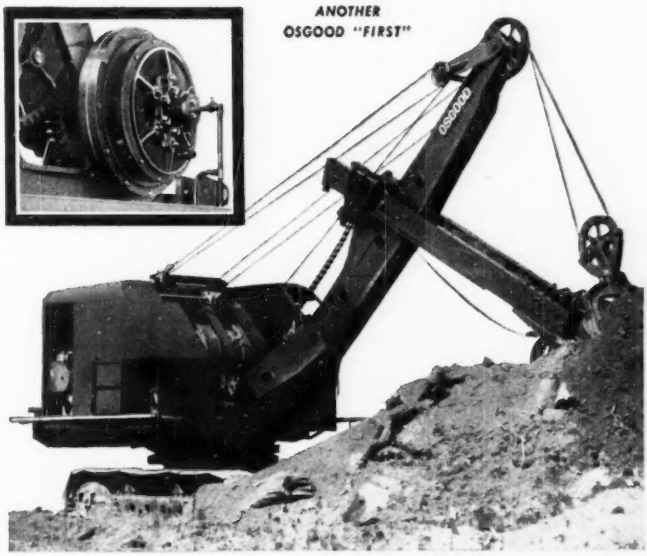

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Dr. E. R. Weidlein, Director of Mellon Institute, announced the establishment there of a research fellowship by the Western Pennsylvania Coal Operators Association. The program of this fellowship, which will be started during the first part of January, will embrace scientific studies of the causes, prevention and control of coal-refuse fires. Dr. William L. Nelson, who will head the fellowship, will investigate the reactions of coal and inorganic sulfides, especially at low temperatures, and will accord research to all factors entering into the problem of the spontaneous combustion of coal-waste, particularly where heaped or piled. In this work he will have the advisory guidance of Dr. George D. Beal, Assistant Director of Mellon Institute, and of a technical committee constituted of Charles B. Baton, Greensburg-Connellsville Coal and Coke Company, Henry F. Hebley, Pittsburgh-Consolidation Coal Company, J. B. Morrow, Pittsburgh Coal Company, and Harry A. Sutter, Executive Vice President of the Donor Association.

Dr. Nelson, the incumbent of the fellowship, is a specialist in organic chemistry who has been connected with Mellon Institute since 1926, when he received his Ph.D. at the University of Pittsburgh. Born in Torrington, Conn., in 1896, he was graduated at Trinity College with the degree of B.S. in 1920. During the next two years he was in the employ of the Crucible Steel Company and then from 1922 to 1926 he served as an instructor in chemistry at the University of Pittsburgh. His investigational experience has been comprehensive, including many of the fundamental aspects of the program.

Commenting on this projected research Dr. Weidlein said: "We trust this far-reaching program relating to an important industrial and communal problem will enable the acquisition of knowledge applicable in preventing or controlling coal-refuse fires throughout this area and elsewhere. Cooperation will be initiated with all interested agencies and the fellowship will bend every effort to reach as early a solution as possible. The Institute is undertaking this research at the urgent request of coal industry members who are to be commended for this progressive step in the smoke-control movement.

"This new fellowship will enjoy the collaboration of and will benefit from the experience of the Institutes fellowship on mine acid control, founded in 1946 by the Department of Health of the Commonwealth of Pennsylvania. The latter fellowship has accumulated many valuable data regarding the activity of the various types of sulfuritic material occurring in coal seams. Together these fellowships will form a team that should evolve a new environment for the greatest coal-producing area in the world."

Three additional assistant divisional parts managers have been appointed by General Parts Manager M. T. Deames of Caterpillar Tractor Co., Peoria, Illinois, in a move to provide adequate managerial personnel to keep pace with the departments expansion program.

The appointees were T. A. Dunne in the Eastern Division, J. E. Ferguson in the Central Division and W. R. Owens in the Western Division.

Mr. Dunne will serve with Eastern Division Manager B. J. Grimm and assistant J. F. Heschong; Mr. Ferguson with Central Division Manager Thomas H. Hodgin and assistant C. F. Cummings; and Mr. Owens with Western Division Manager Herman F. Haven and assistant W. E. Doersam.

Nelson L. Davis Company, Chicago, announces the appointment of Andrew J. Gaber as research engineer. He formerly was manager of the Terre Haute office, Commercial Testing and Engineering Company, and previously had been plant control chemist at Champion No. 1 Coal Preparation Plant, Pgh. Coal Co.

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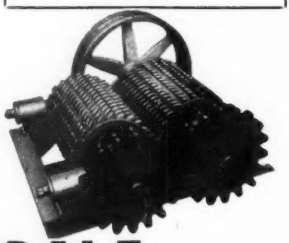

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Box 51 Scottdale, Pa. Dept. MC.

When Republic Stamping of Canton, Ohio, decided to improve on the old fashioned dinner bucket, salesmen of the concern quizzed men in coal and metal mines, mills, factories, construction gangs, railroaders, oil crews and all types of outdoor workers about their likes and needs in food-carrying equipment.

Their suggestions were incorporated into a heavy gauge all aluminum, round, rust-proof dinner pail fitted with tight food and water compartments. Roll rim edges, overlapping collars, simple bayonet and spring locks seal out all dirt, dust and moisture.

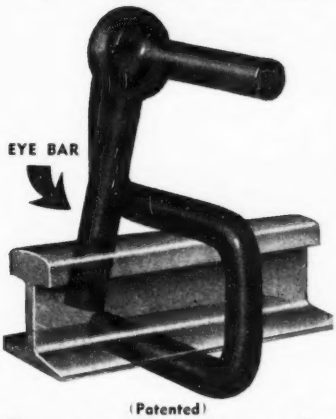
Assembled, and with pail handle raised, all parts are held securely together by spring locks on each side (Fig. 1). The firm handle makes pail easy to pick up, prevents "pendulum swing' when carried. Bayonet lock on cover (Fig. 2) enables one to lift out food compartments as a unit and prevents rats or animals from getting at food. Large inset pan will accommodate 2 quarts of soup, beans, meat and potatoes or the like . . . has overlapping collar (Fig. 3) to protect foods from water spilling in or dust seepage. Dessert and utensil tray nests on top. The bottom on outside pan easily holds 3 quarts water, tea or coffee and if extra pan is needed, cover may be used, turned over.

Now in production, the new dinner paid is meeting instant approval from workmen in all types of industry whose suggestions helped put the item on the market. Manufacturer — Republic Stamping and Enameling Co., Canton, Ohio. Availability—immediate.

• SAFE and DURABLE •

REDIPT

"S" CAR HOLD



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FULL BEARING
DRAG LINE CHAIN
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The flexible coupling for all types of pipe.
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TRANTER MFG. CO.
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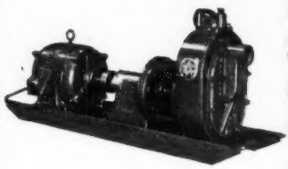

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SPECIAL BARGAIN
3—Type A3G Goodman Duck bills.

COAL DRILLS
2—Jeffrey—250 v. DC.

COMPRESSORS—SPECIAL BARGAIN
7—240 cfm Westinghouse 3 cyl. vert. 150 lb. pres. dir. con to 50 HP AC Slip ring or DC Motors.

TRANSFORMERS
20—New 25 kva, 450 v. pri. 220/110 v. 1 ph. 60 cy. Allis-Chalmers.

MOTOR GENERATOR SETS
250 v. DC—Motors 220/440 or 2200 v. 3 ph. 60 cy.

No.	KW.	Make	Speed
1	150	West.	1800
1	135	G.E.	1200
1	100	West.	1600
2	100	Delco	1150
2	75	West.	720
1	60	Cr. Wh.	900
2	60	West.	490

D.C. Generators—250 v. D.C.

No	KW.	Make	Speed
1	250	West.	1200
1	175	G. E.	700
3 New	135	G. E.	1150
1	125	West.	560
1	125	Allis-Chal.	1150
1	110	West.	700
1	100	Allis-Chal.	1150
1	75	West.	750
1	40	G.E.	720

A.C. Generators—220/4000/440/220 v.

No.	KW.	Make	Speed
1	125	West.	257
1	450	Elec. Machy.	120

Pumps With A.C. or D.C. Motors

Qua.	Gpm.	Head	Kind	Make
3	1200	300	Cent.	Worthington
3	1100	323	Cent.	Worthington
3	1000	336	Cent.	Worthington

D.C. Motors—230 volts

No.	H.P.	Make	RPM	Type
1	175	G.E.	550	MD

SAVE OVER 50% ON NEW BLOWERS AND VENTILATING FANS

AXIAL FLOW VENT. FANS
1—4000 cfm 6x3" stat. pres. Sturtevant with 4/1.2 hp., 1750/1150 rpm., 220/3/60 motor.
2—4000 cmf 3" stat. pres. Sturtevant 2 speed AC Motors.
2—5000 cfm 1.8 stat. pres. Sturtevant 220/440 v. AC Motors.
31—6000 cfm Sturtevant Bul. No. 512389, 3" stat. pres., 7 blade dir. con. 5/1.5 hp. 1765/1175 rpm., 220/440 v. AC West. TEFC Motors.
2—6000 cfm Sturtevant 1.65" stat. pres. 220/440 v. AC Motors.
1—7500 cfm Clarage 7½ hp., 220/440 v. 2 speed motor.
2—12000 cfm 3" stat. pres. Sturtevant with dir. con. 10/3 HP. 1775/1180 rpm., 220/440 v. TEFC Motors.

115 VOLT D.C.
8—4000 cfm Sturtevant, 3" stat. pres. West. SK Motors.
4—4000 cfm American Blower, 3" stat. pres. 4/1.7 HP. Motors.
1—3000 cfm Sturtevant, 3" stat. pres. 3/1.25 HP. Motor.

HOISTS OR WINCHES
200—1½ ton Hand Cranked ratio 27:1 thru an enclosed double reduction gear unit with 4 planetary gears mounted on steel plate complete with 48' of ¼" cable, ratchet type brake, push button release.

CAR PULLERS
100—Brand New with ¼" cable, 1½ and 2 ton A.C. or D.C. Motors.

COMPRESSORS
1—315 CFM Ingersoll Rand Portable, 100 lbs. pres. driven by 105 HP Waukesha Oil Engines, 860 rpm.

BARGAIN — FOR SALE

100 KW. Diesel Engine Generator Sets
11—100 KW., 250/275 v. D.C. Delco Generators dir. con. to 150 H.P., Model GBD-8, 5½ x 7, 8 cyl. Superior Diesel Engines, electric starting with muffler, power panel and accessories.
Practically as good as new—
Only Used for spares.

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STORAGE BATTERY LOCOMOTIVES
Any Size Any Track Gauge
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Greensburg Pennsylvania

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KNOXVILLE, TENN. PORTSMOUTH, VA.

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FOR REBUILT ELECTRICAL EQUIPMENT

LOCOMOTIVES
Haulage and Gathering Locomotives
20 Ton Jeff. and G.E. 500 v. 42" Ga.
(Can be rewound 250 v.)
12 Ton West. 250 v. 36 or 44" Ga.
8 Ton Goodman 500 v. 42/44" Ga.
(Can be rewound 250 v.)
6 Ton West. 250 v. 904 Motors 36" Ga.
2-4 Ton Goodman 42" Ga. 250 v. with reel.

SLOPE AND SHAFT HOISTS
50 HP Heyl Patterson sgl. fixed drum.
75 HP Meade Morrison sgl. fric. drum.
75 HP Diamond sgl. fric. drum.
200 HP Vulcan dbl. drum shaft.
300 HP Lidgerwood sgl. fixed drum.

STORAGE BATTERY LOCOMOTIVES
6—7 Ton Jeffrey 42/44" Ga. BB Motors.
6 Ton G.E. perm. 36/44" Ga. HM 825 BB.
8½ Ton Ironton Type A 36/42" Ga.

MINING MACHINES
112 EJ Goodman 230 v. DC 7½' bar.
36 B Jeffrey Perm. 230 v. 7½' bar.

M-G SETS—ROTARIES (3 ph 60 cy.)
35 KW G.E. 125 v.—50 HP 220/440 v. Ind.
10 KW Bardco 125 v.—15 HP 220/440 v.
460 KW G.E. 250 v.—710 HP. G.E. Syn. 2300 v.
300 KW G.E. Rotary 250 v with 3-110 KVA 2300/4000 v. Transformers.
300 KW 250/125 v. con. 2-150 KW West. SK 125 v. Gen. dir. con. 450 HP Motor.
100 KW West 125-150 HP West. Ind.
75 KW 75 v. West.—100 HP West. Ind.
50 KW 125 v. G.E.—75 HP G.E. 2200 v.
40 KW 250 v. West.—60 HP West. Ind.

COAL CRUSHERS
18x24 and 18x30 New Scottdale dbl. roll.

AIR COMPRESSORS
1100 cu. ft. 100 lb. pres. Chic. Pneu. 2 stage dir. con. 215 HP West. Syn. Motor.
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356 cu. ft. 100 lb. pres. Chic. Pneu. 12x10.
245 cu. ft. 100 lb. pres. Ing. Rd. ER1, 10x10.
175 cu. ft. 100 lb. pres. Chic. Pneu. 9x8.
164 cu. ft. Chic. Pneu. Steam Type.

DC MOTORS

HP	Make	Voltage	Wdg.	Speed
7½	G.E.	230	sh.	1750
7½	West.	230	cp.	1050
10	West. SK	230	cp.	1150
10	G.E. CD	230	cp.	1750
13	West. SK	230	sh.	875
15	Cr. Wh.	230	sh.	1750
15	West. SK 110	230	cp.	750
20	West. SK	230	sh.	1750
40	G.E. RC	230	sh.	1150
50	West. SK	230	sh.	1750
50	West. S	230	cp.	875
60	Rel. T 461	230	sh.	800/1200
125	West. SK 193	230	sh.	450/1000
200	G.E. RC	550	cp.	875
375	West.	230	cp.	430/860

AC MOTORS (3 ph. 60 cy.)

HP	Make	Wdg.	Spd.	Type
300	G.E.	S.R.	600	IM
300	West.	S.R.	450	IM
200	G.E.	S.R.	600	IM
150	G.E.	S.C.	695	KT
150	G.E.	Syn.	600	ATI
125	G.E.	S.C.	695	KT
125	West.	Syn.	277	——
100	G.E.	S.R.	450	IM
100	Al. Ch.	S.R.	600	——
75	G.E.	S.R.	575	ITC
75	G.E.	S.R.	600	IM
75	West.	S.C.	900	CS
50	Al. Ch.	S.C.	1750	——
50	G.E.	S.C.	900	IK
50	G.E.	S.C.	1150	KT
40	G.E.	S.C.	860	KT
35	G.E.	S.C.	1200	IK
30	G.E.	S.C.	1200	KG405
25	Cr. Wh.	S.C.	600	——
25	Cr. Wh.	S.C.	860	——
25	Cr. Wh.	S.R.	600	——
15	L. A.	S.C.	3600	——
15	West.	S.C.	1750	W326
10	West.	S.C.	1160	CS
7½	Comm.	S.C.	865	P326
5	West.	S.C.	565	CS546
5	West.	S.C.	1180	OS

REDUCTION UNITS
500/700 HP Morse Chain Drive. 4.28 to 1.
300 HP V Belt dr. pulleys 30" and 48" supported by 2 roller bgs. with pedestals.
150 HP Nuttall 1.6 to 1.

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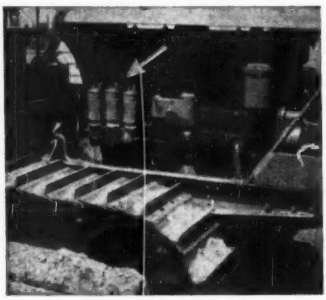
Convinced that every miners take-home dollars exert an influence matched by no other appeal, National Coal Association, Washington, D. C., has gone right to his pay envelope with their safety program.

Mine management, active in carrying NCA's safety program into the mines, has heartily accepted this new direction, and more and more miners are being impressed with the realization that safety is a personal project. At least a hundred thousand miners are reached regularly.

Attached to the very dollars that miners earn are inserts that point up specific dangers—and every insert bears the poignant question, "Are you going to be on the payroll next week?"

This is in fact the application of powerful "point-of-sale" persuasion, and, like its counterpart in merchandising, can prove to be that factor that effects the greatest impulse action.

"Point-of-sale" appeal has, in the idiom of merchandising, achieved the all important "I'll buy that"—and, in the opinion of National Coal Association, a strong safety appeal at the "point-of-pay" will get the same reaction.



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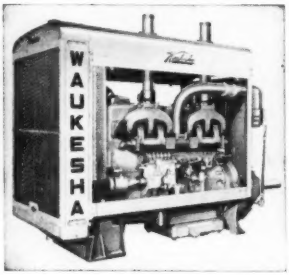

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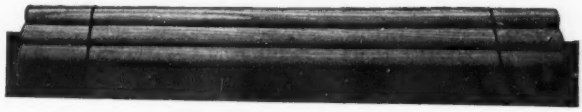

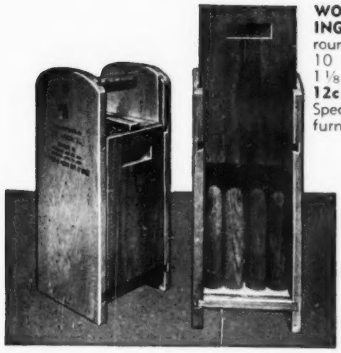

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EXPLOSIVE BOXES: Made entirely of wood having no metal parts, tongue-grooved and dovetailed construction with automatic lock using a rubber band for a spring, treated with paraffin to make moisture resistant. "Approved by the Pennsylvania Department of Mines." Sizes as listed based on 1¼" x 8" sticks.

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No. 12 Powder Box	**$ 2.40**	"	No. 72 Powder Box	**$ 7.50**	"
No. 16 Powder Box	**$ 2.85**	"	No. 90 Powder Box	**$ 8.40**	"
No. 20 Powder Box	**$ 3.10**	"	No. 6 Cap Box (Sizes 2½" x 3" x 6" Inside)	**$ 1.70**	"
No. 25 Powder Box	**$ 4.20**	"	No. 8 Cap Box (Sizes 2" x 2½" x 8" Inside)	**$ 1.70**	"
No. 36 Powder Box	**$ 5.30**	"			

The above boxes are rigid and non-conductive.

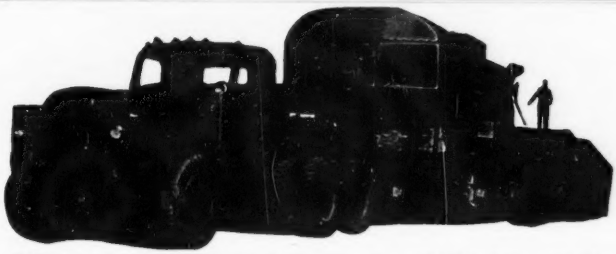
J. V. Hammond Company **Spangler, Pennsylvania**

SALEM "HERCULES" AUGERS FOR ELECTRIC DRILLS

Made To Withstand High Drilling Speed, Whip And Torsional Strain Of Electric Drills

Drills holes faster — Will not snap off shank or chip points — Outlasts four or five ordinary augers

THE SALEM TOOL COMPANY SALEM, OHIO, U.S.A.



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7—MISSISSIPPI WAGONS

Save more than $4000.00 per unit. Model 75-S, 8½ yd. tractor, cab electric brakes.

5—brand new; 2—used three weeks. New equipment guarantee.

2—TERRA COBRAS

Used only a few weeks. Model TA Tractor; TCY scraper has 18 yd. heaped capacity. New equipment guarantee. Reduced to $17,500 each.

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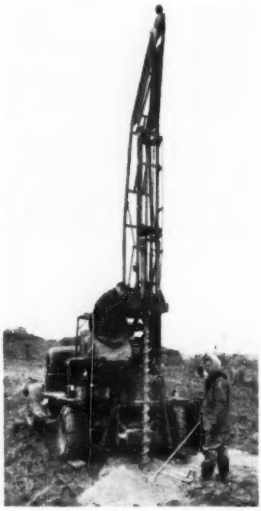

The Buda Earth Drill, Model H.L.B., on coal stripping job of Jefferson Coal & Coke Co. near Burgettstown, Pa.

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MODEL H. L. B.

The drill that Coal Strippers have been waiting for!

A speedy and efficient way to put down holes of 25 to 100 feet. Augurs may be hauled up in 20 ft. lifts; hydraulic retraction of the entire lift enables complete sampling and drilling without moving truck.

Diesel or gasoline powered.

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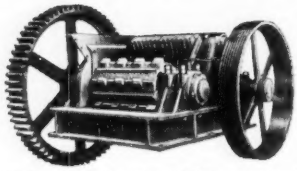
McLANAHAN GIANT ROCKMASTER COAL AND ROCK CRUSHERS

● RUGGED ● DEPENDABLE ● ECONOMICAL



McLanahan Rockmaster with Hopper removed.

Built for heavy duty—Patented Automatic Steelstrut Toggle for tramp iron protection, reversible and interchangeable crushing plates, quick adjustment of sizes. Babbitt or split bronze bearings. Steel constructed throughout for longer, trouble-free service life.

Descriptive Bulletin on request

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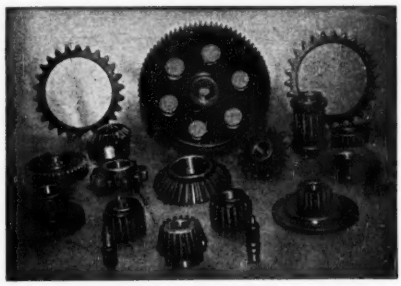
Since 1835
HOLLIDAYSBURG, PENNSYLVANIA

Genuine Pittsburgh GEARS and PARTS



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Drop Forged, Electric Welded, Fire Welded
A "Superior" line of Mine Car Couplings of all sizes—various types — All sizes, 7/8 in. & larger.
Shackles — Cutter Bits — Bit Steel

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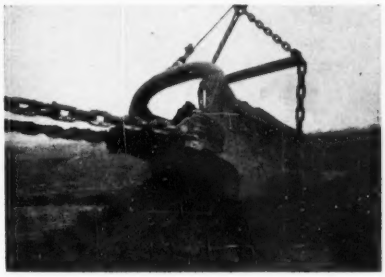

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How much payload will it move? How long will it last? These are the yardsticks to use for judging a dragline bucket . . . and here's how ESCO dragline buckets measure up.

Engineered for Oversize Loads

Operators frequently use larges size ESCO buckets than would be possible with other makes. This is due to the ESCO engineering principle of maximum strength without excessive weight.

Wearing parts need not be made excessively heavy to allow for wear. They are made of wear resisting ESCO Manganese Steel which polishes in use, minimizes friction, becomes harder and tougher the more it works. Hollow arch construction further reduces weight and actually increases strength.

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ESCO places weight where strength is essential. Result: ESCO buckets outlast other makes, operate with maintenance work and expense.

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"Operators generally use larger size ESCO dragline buckets than is possible when using competitive buckets due to:

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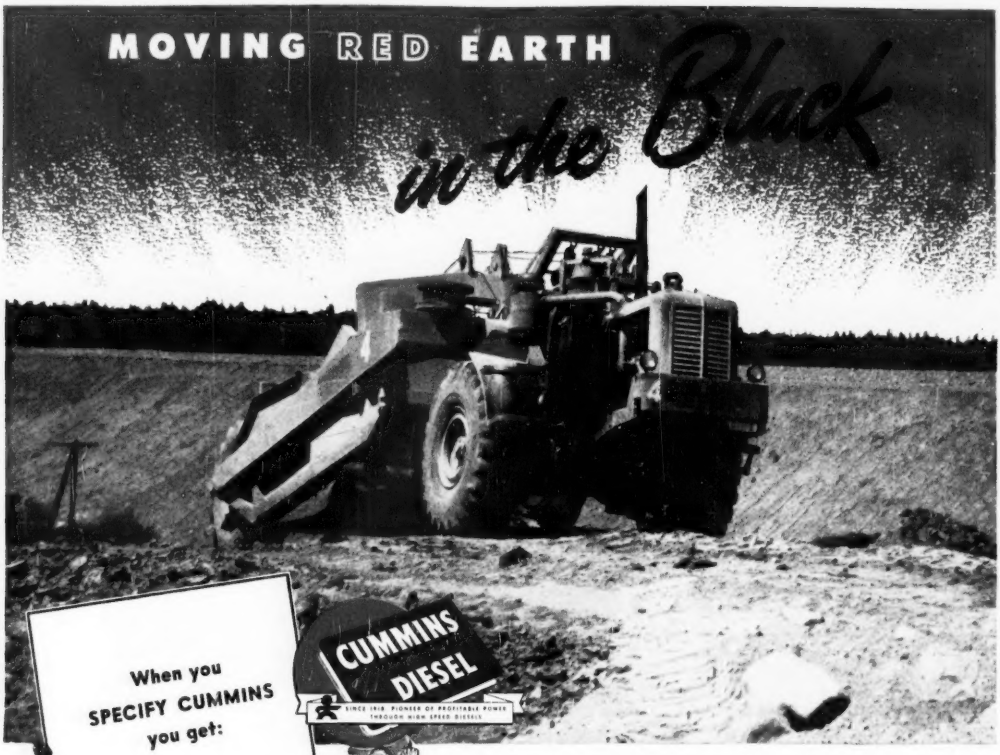

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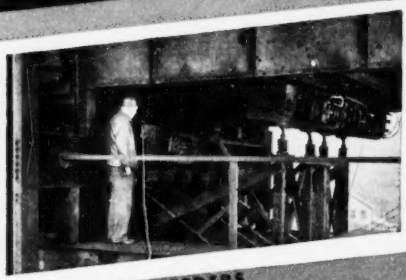

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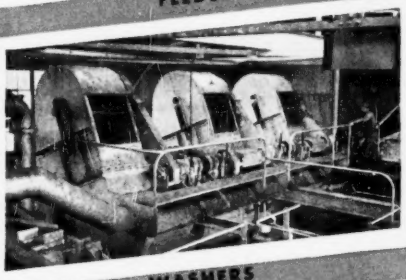

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